merely flat. Here (4) are two examples of these stops; one is very simple from the church of Montreale; the other being very rich and from the sacristy of the church of Vezelay. The stonecutters thus avoided for the laborers and setters the difficulty of setting the imposts (always very heavy) bearing fragile mouldings at the lower bed, and consequently easily injured. Besides the is pleased by these stops that prevent the mouldings from meeting the abacus of the capital abruptly and without hesitation. In this case as in many others, the reasoning of the artist was in accord with his instinct.

CONSOLE. Corbel. Console.

A support inserted in a surface and supporting as a corbel an architectural member.

CONGE. Apopnyge. Annular cove. Stop.

This designates the transition from a moulding to a surface. On the Roman column the apophyge is the curve connecting the shaft of the column to the bottom fillet placed on the base; let (1) be a profile of a Roman base, A is the apophyge. In Romanesque architecture and particularly in Gothic architecture, the shaft of the column being in a single line, i.e., n not having any lower projection, the base has no apophyge, a and the first torus of that base directly receives the shaft of the column. (Art. Base). It is the same for the astragal of the capital; that moulding has no apophyge, with rare exceptions during the primitive Romanesque epoch. In the architecture of the middle ages is also designated by stop (conge) the end or termination of a moulding stopped by a sharp edge. The word stop indeed expresses the object; it is a leave (conge) given to the moulding to cease to exist. Thus in the edifices of the 12 th century in particular may frequently be seen chamfered edges, either by a simple bevel or by a moulding, that dees not extend to the ground, but stops at the lower c course or on a band, passing to the right angle by means of stops of very varied forms. Fig. 2 reproduces several examples of these stops' all are taken from monuments of the end of the 12 th century belongiug to Burgundy; for it must be stated, that in that province is found the most variety in these endings of mouldings. The beauty of the cut stone decided the s stonecutter to leave the beds intact and the angles sharp at the origin of each architectural member. There are stops of remarkable richness. The central mullion of the church of V Montreale ends at its lower part in stops decorated by sculptures in excellent taste; we give a sketch of it here (3). It is difficult to pass more skilfully from a group of mouldings to a rectangular base. If the mouldings of the jamb, frames or pilasters are terminated at their lower part and beneath the lintel or capitals by stops, by a stronger reason the moulded arches of vaults are accompanied at their springing by this stop, which leaves to the lower bed of the impost its e entire bearing. The mouldings of the arches of the 12 th century, instead of descending to the abacus of the capital stop at a higher level and end in stops, so as to allow the lower bed of the impost to rest frankly, as if this impost were ne-

placed on the great French edifices, and these pipes are nearly always decorated by reliefs or gilding. Very beautiful ones are seen beside the south portal of the cathedral of Beauvais. They are found in great number on the chateaus of the Renaissance, but these articles were removed at the end of t the last (18 th) century to be melted.

The removal of rainwater was for architects of the middle ages a subject of constant anxiety. It is easy to recognize t that they often hesitated between the system of leading the water and casting it off into the open air, aud that consisting in directing it into closed pipes; both of these matnods nad their inconveniences and their advantages; the first especially wets the surfaces and the substructure; but if tne stone employed is compact, if it be not affected by frost, that external moisture is soon removed by air and sun. It has the advantage of easy maintenance, since all channels are visible and in the open air; it avoids stoppages and concealed injuries, that appear only after the evil is produced. The second avoids wetting the external surfaces; it leads the water to fixed points, it does not produce around the building that d deluge, that renders its surroundings disagreeable, but it requires constant supervision, particularly during alternations of frost and thaw; it produces stoppages during snow, is subject to ruptures frequently remedied with difficulty, and only perceived when the injuries caused have made great ravages in the construction. It is therefore necessary not to specify in an absolute manner either of the two systems. It is for the architect to use them as proper, according to the place and t tne material employed. Yet we must state, that in very large public edifices where oversight cannot be exercised as in a private structure and a place daily inhabited, leaders of metal and especially of cast iron, which breaks so easily under the force of frozen water, have very great dangers, that their congestion or the slight leakage at each joint ends iu altering the surfaces and producing a permanent dampness. Lead pipes are best, because they retain a certain flexibility and can stretch, especially if the section is square. Extreme care in the establishment of these pipes and in anchoring their fastenings, entire isolation and gargoyles of larger size in case of stoppage can always remedy these inconveniences. (Arts. Cuvette, Dauphin).

enlarged in cup form with edges held under the gutter course with a drip formed under the bed. In this case the water flowing toward the opening only at one side, this drip only exists under that as we have traced it at E. In the great edifices erected at the beginning of the 13 th century the water from the upper gutters flowed through hollow gargoyles on the flat copings of the flying buttresses, as at the cathedral of Rheims even today. The water rapidly injured these copings, a c concave section was given to them; but the middle blew the s stream from the gargoyles aside from these channels, and that is why vertical pipes enclosed in the stone ducts were adopted over the heads of the flying buttresses. Yet when even the water from the upper roofs of the great edifices was led by pipes, these only reached the level of the channels of the chapels or side aisles, and from these it was cast on the ground by gargoyles according to the most common method. The upper buttresses of the choir of the cathedral of Amiens receiving the flying buttresses (about 1260) allow to be seen in a reentrant angle long cylindrical grooves intended to receive hre leaders of lead, which were never set (5); the same arrangement is adopted for the discharge of water in the cathedral of Nevers. At A is traced the horizontal section of these grcoves. The water descends from the upper gutter by the channels B serviug as copings of the tracery of the flying buttress. In the thickness of the buttress at the level C is a cup that must receive the water to lead it into the vertical pipe placed in the recess. It is only in England that we find after the 14 th century lead pipes terminating at the base of edifices. Instead of being cylindrical, these pipes have a square horizontal section, and that is very well reasoned. A cylinder cannot expand; it results that in a strong frost if the p pipes are filled, the ice assumes a greater volume than the liquid water, these pipes are liable to burst. A pipe with s square section can yield and ruptures are less to be feared. These lead pipes are most frequently placed in the reentrant angles, are made in parts entering into each other, like our cast iron pipes with couplings or collars of wrought iron or bronze to keep them in place' they are surmounted by cups also of lead with spouts at their lower ends.(6).

In the 16 th century cylindrical pipes of lead were often

the buildings are solid and do not fear frost, allows constaantly tne inspection of the condition of the leaders, since then are in the open air, is disastrous when the stone used in the substructure is injured by frost or is porous; for then these streams wet the lower surfaces, and od not delay to saturate them with salpetre and even to destroy them. These inconveniences were evidently recognized by the architects of the 13 th century, since in some great edifices of that epocn we see strong vertical leaders replace the gargoyles. In Normandy and Picardy, where the climate is damp, the materials are affected by frost, leaders for water were adopted from ab about 1230 in certain churches. At Bayeux we see the flying buttresses of the nave lead the water from the upper roofs i into lead pipes inserted in the buttress. These pipes are visible or concealed in each alternate course; thus they are p protected from external shocks and are still visible if rupture occurs.

Here (2) at A is the plan of that arrangement, at B is the elevation of the parts of the buttress containing the leaderr, and at C is the detail of the cylindrical recesses containing the lead pipes, slightly flattened next the opening to allow the passage of the small lintel.D. The buttresses of the flying buttresses of the choir of tne same church containing leaders were not so well arranged as those here given, because they are inserted in the middle of these buttresses and are only seen through narrow slots. In plan (3, tnese pipes are placed at A, the slots being at B, and the outlets to a gargnyle are placed at C. From the upper gutter of the great roof the water is led in the channel of the flying buttress, likewise by pipes passing through the buttress terminated at its lower p part by a head forming a spout. (Art. Dauphin). We find above the flying buttress od the nave of the cathedral of Seez (about 1230) a similar arrangement , but preferable to that adopted at Bayeux, because the buttresses containing the leaders for the water from the great gutter are merely ducts, hollow vertically to their bases and without bends or offsets, so as to prevent all stoppages. Here (4) at A is the horizontal section of these ducts,at B their perspective, at C the section on tne axis of the leader. Usually as indicated at D, the vertical lead pipes enclosed in the stone ducts have tneir tops

or terra cotta. Such a natural means was employed py Romanesque architects, who only constructed edifices of great simplicity in plan and covered by gable roofs. Yet there were certain circular structures where was felt the need of collecting rainwater and consequently of directing it. Im the cloisters of abbeys, courts of castles, often built on elevated sites, springs were lacking, and a supply of water could only be obtained by excavating listerns into which was led the water from the rcofs, avoiding its flow over the ground, so as to have it pure as possible. Then placing gutters of stone or wood at the edges of the roofs, the constructors placed at certain distances hollow piers furnished with basins at their tops to collect the water brought by the slopes of the gutters. These piers were almost always detached and not a part of the construction, thus avoiding the slow but very injurious leaks into the structure. We have also seen along the wall of the southern side aisle of the nave of the abbey church of Vezelay detached leaders, intended to lead the water falling on t the roof into the cistern excavated at the middle of the cloister. These leaders fo not belong to the primitive construction, but to an epoch when the cloister was built, i.e., to the end of the 12 th century. They were built of square courses of stone, pierced at the centre by a cylindrical hole, with circular grooves in the beds to receive the cement.

Here is what was (1) the external form of these leaders; at A is seen one of the stones with the circular groove in its bed. We have frequeutly seen in the castles of the 12 th and 13 th centuries square leaders of stone arranged in the thickness of the construction (leaders are not to be confounded w with speaking tubes), and that were intended to send into the cisterns the water falling on the roofs. When in the 13 th c century the construction of churches must present complex combinations, very considerable areas of roofs receiving water, architects first thought of removing the water by the shortest way , i.e., by causing it to flow from the gutters along the channels of flying buttresses to the strongly projecting gargoyles, that cast it on the ground outside the edifice. D Dividing this water among an infinite number of jets, their destructive effect was materially reduced. This means, which is always best when the materials used in the lower parts of

columns of cloisters and galleries, never those occupying reentrant angles and engaged to piers; for in the last case the diminution of the shafts would have produced a bad effect. On the banks of the Rhine we find Romanesque edifices in which the little columns are cut in a very pronounced conical form. For example on the cathedral of Worms the external galleries present a series of small columns with very sensible diminution at top.(8). Gothic architects but rarely diminished their detached columns. Yet those of the arcade of the S. Chapelle of Paris are so, though but very slightly. In the 14 th century one scarcely finds isolated small columns; such are subdivided in several members like the arches they support. At that epoch they commence to bear a projecting rib, that gradually attains the prismatic form.

The Renaissance in resuming the antique column frequently ornamented it by arabesques, flutes or scrolls. There may be seen at the Ecole des Beaux Arts at Paris columns from the chateau of Gaillon, which are very richly sculptured. The little turret of mansion de la Tremoille at Paris was supported on two little delicately carved columns. These are likewise deposited at the Ecole des Beaux Arts.

COMBLE. Roof.

A carpentry structure receiving metal, slates or tiles, and covering an edifice. (Arts. Charpente, Coverture).

CONDUITE. Pipe. Tube. Duct. Leader.

A pipe of metal, terra cotta or stone, serving to conduct water either horizontally or vertically from the top of an e edifice to its base.

The Romans frequently arranged vertical leaders in their g grand monuments to remove from them rainwater within them. P Particularly amphitheatres and theatres, which presented a c considerable area of seats directly exposed to rain, possessed at certain distances vertical leaders simply perforated t through the masonry and leading the water to the ground. In edifices of more simple construction, the temples, basilicas and private dwellings, the rainwater fell freely from the roof to the ground, either at the edge of the covering or by m passing through little spouts pierced in the gutters of stone

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of Puy-en-Velay, so remarkable, by its ornamentation, retains shafts of little columns with an extreme delocacy of sculpture. (3). These are composed of drums alternately black and w white, which added to the ornament covering them, produces much effect. One will also note how that the astragal is cut on a square plan, and that of the shaft passes from the cylinder to this square plan by an ornament C. The beds of the black and white drums are alternately placed at A and B.

If we near Ile-de-France, the architecture of the 12 th century prefers more of this sort of decoration applied to little columns; and when it employs them, this is always in particular cases, as for example for little columns placed between the statues of the portals, and these decorations do not destroy thus the apparent stability that a support should retain. The portal of the church of S. Denis, the royal portal of the cathedral of Chartres supplies us with beautiful examples of little sculptured columns placed beneath or between the statues. Here (4) is one of the little columns from between the statues, (Royal portal of cathedral of Chartres), and (5) one of those supporting statues.

The little columns of the 12 th century are frequently twisted, and sometimes have 6 or 8 sides. The portal of the church of S. Lazare at Avallon, which is one of the most remarkable examples of the 12 th century, possess prismatic columns, twisted (6) and cut with rare perfection in a single piece of stone. The imagination of the last Romanesque architects goes very far in the ornamentation of little columns, even to give them the appearance of an elastic and flexible body. On the jambs of the same portal of S. Lazare of Avallon, we see the shaft of the little column, which presents a net of small cords, (7).

The architecture of the 13 th century entirely renounces t the decoration of little columns. Gothic architects were too rationalistic to give to these supports that flexible appearance. They sometimes contented themselves by merely ornamenting them with paintings. (Art. Peinture).

After that epoch are seen little columns (whatever the lengths of their shafts) adopt diameters that vary little, 6.3, 4.3, and the smallest mullions being 3.2 ins.

Romanesque architects generally diminish little detached

colugns engaged to the piers of Gothic architecture, or to s secondary columns engaged to the piers of Romanesque transition architecture.

Little columns engaged to the piers in the transition Romanesque are always dependant on the construction until about 1 1160, i.e., they form a part of the courses of these piers; b but after that epoch until about 1220, they are independent of the construction in courses, are separate and set on end. Dating from 1230, they are again seen to form a part of the construction in courses until the end of the Gothic period. Art. Construction). It goes without raying that this rule is not without exceptions.

Romanesque architects often placed in cloisters, galleries, twin bays, little detached or coupled columns bearing the arches; these small columns are made of hard stone and even of marble. In the cloisters of the southern provinces they are often sculptured; their shafts are ornamented by helices, flutes, scrolls, foliage, scales, even sometimes by legendary subjects. The cloister of Elne near Perpignan presents a quantity of these little marble columns, all whose shafts are covered by varied ornaments of the 12 th and 14 th centuries.[1]

Note 1.p.497. We owe these drawings to the courtesy of M. Loisne, architect.

We give (1) two of those shafts; that at A dates from the 12 th century; the other at B belongs to the restoration undertaken in the 14 th.

Roman antiquity and many Gallo-Roman monuments already possessed columns decorated by slightly projecting sculptures; that tradition was followed by architects of the 11 th and 12 th centuries. Yet these employed this species of decoration only in particular cases, for cloisters as we have just stated, and for portals, so as to give great apparent richness to the entrances of edifices. The 12 th century was lavish with small sculptured columns. It will suffice for us to give some examples. Those presented came from the parish church of Tournus, 12 th century (lower city). The cathedral of Autun, the churches of S. Andoche of Saulieu, abbey of Vezelay, S. Lazare of Avallon, and in general the monuments of the Saone, Rhone, upper Marne and upper Loire, exhibit on their portals little columns curiously sculptured. The north porch of the cathedral

one of the best examples of these stone columns of a considerable height and an extremely small diameter. But such is the happy arrangement of these columns, borne on a stylobate with octagonal base, and separated at about the middle of their h height by a moulded ring, that the eye is not shocked by their excessive slenderness, and that they appear to have sufficient strength, as they actually do, to support the tow rows of vaults that rest on their expanded capitals. (Arts. Bague, Chapiteau, Construction).

Ile-de-France seems to have retained columns in the naves of its churches later than the other provinces. Notre Dame of Paris, the old portals of church S. Severin at Paris, the churches of Champeaux, the chapel below Crecy, of Bagneux, etc., support their naves built about the end of the 12 th century and the beginning of the 13 th, on columns that rise to the height of the archivolts of the side aisles, and whose capitals bear the groups of little columns receiving the high vaults.

Columns engaged to Romanesque piers generally during the 11 th centuries are engaged for only a third; whatever the dimensions of the edifices, their diameters vary from 1.1 to 1.4 ft. On the banks of the Oise during the first years of the 12 th century, these engaged columns present a peculiarity that permits mention. Their horizontal section, instead of presenting a circular arc, is composed of two arcs forming an edge at t the tangent parallel to the face of the pier, as shown in Fig. 2. We find these columns in the old part of the church of S. Maclou at Pontoise and in the church of S. Etienne of Beauvais. We must assume that the architects gave that form to their engaged columns to avoid the softness and indecision of a cylindrical surface. These columns are only 1.0 ft. in diameter, but thanks to that edge formed by the two circular arcs, they present to the eye at each side surfaces more developed than those offered by a cylinder. In all the members of the Romanesque transitional architecture of the banks on the Oise is also noted a certain research indicated by a great refinement in mouldinms and details.

COLONETTE. Little Column or Shaft.

A little column; also applied in mediaeval architecture to columns with very elongated shafts of small diameter, to col-

etc., show us dimensions and cutting, that yield in nothing to the columns of Roman monuments. However the architects of the middle ages have cut flutes on shafts of columns but very rarely. On the exterior of the choir of the abbey church of S. Remy of Rheims (12 th century) is found however an example of fluted columns under the attachment of the flying buttress. But at Rheims existed and still exist antique monuments, that evidently were the origin of this kind of decoration. From t the 11 th century were already cut columns on the lathe according to the antique method. The monolithic columns of the choir of the church S. Etienne of Nevers were dressed on the l lathe. In Auvergne, where the art of building at that epoch had attained a remarkable degree of perfection, one finds in the choirs of churches turned monolithic columns. In Berry a and Poitou during the 12 th century turned columns are very common, and the workmen took care to leave on the shafts the traces of the lathe indicated by very slightly projecting bands or very fine horizontal scratches. The architects that e erected columns during the Romanesque period did not trouble themselves to establish a conventional proportion between the height of the shaft and its diameter; the nature of the materials employed, the load to be supported, the location and t the general arrangement of the monument were the only laws imposing these proportions. In the 12 th century, when the art of architecture developed and became the object of a profound and reasoned study, architects generally gave to the shafts of their monolithic columns proportions that vary little; yet it is already apparent that the resistance of the materials influenced these proportions; if these materials were very strong, the columns were of less diameter with regard to their height, than if these materials were fragile. When at the beginning of the 13 th century, men still employed cylindrical columns not engaged, they sought to reduce their dimensions as much as the quality of the materials permitted, so as to leave in accordance with the principle adopted by the architects of that epoch, the greatest possible distances between the points of support. Then the vaults were supported on columns, whose slenderness nearly equaled that given to supports of wood or of metal in such a case. The refectory of the priory of S. Martin-des-Champs at Paris has preserved to us

Romanesque architects, even when they attempted to replace t the carpentry of the basilicas by vaults, still sometimes desired to retain the columns as a support; they only increased the diameter in order to resist the load of the masonry above. The nave of the abbey church of S. Savin in Poitou, that dates from the 11 th century and has a round tunnel vault with side aisles covered by cross vaults, presents two rows of detached columns composed of courses of stone. The nave of the cathedral church of the city of Carcassonne presents detached columns alternating with square piers having engaged columns. These cylindrical columns bear directly on their circular capitals the imposts of the longitudinal archivolts of the nave, the transverse arches of the side aisles, and engaged columns receiving the transverse arches of the principal tunnel vault. Fig. 1 presents one of these columns composed of stone courses in several pieces. These in reality are only cylindrical piers built of large rubble very rudely surfaced.

If Romanesque architects but rarely erected monolithic columns, this was for lack of power to quarry and cut blocks of stone of large dimensions; for always that they could find antique columns, they did not fail to use them. In Romanesque crypts are often found monolithic columns of marble, which are merely the spoils of antique monuments. When the means of transportation became easies and more powerful, and the skill of s stonecutters equaled and even excelled that of Roman workmen, they undertook to erect monolithic columns wherever their use was necessary. Nearly all choirs of the great churches of the 12 th century possess monolithic columns of hard stone of considerable heightand diameter, and nearly always these columns are diminished, i.ea, they are cut tapered from base to top. Besides it is rare to see these columns bear, like the Roman column, a fillet and cove at the base and an astragal below the capital. These reserved projections required an expensive and useless removal along the entire length of the shaft; the architects preferred to add the cove and fillet to the base, or suppressed these members and the astragal of the capital. (Arts. Base, Chapiteau).

Monolithic columns are not rare during the 12 th and 13 th centuries. The cathedrals of Langres, Mantes, churches of S. Leu of Esserent, Vezelay, Beaune, Pontigny, Semur-en-Auxois

generally employed columns only when surmounted by an entabl-
ature, i.e., they used only the complete orders; if there are
exceptions to these rules, they are rare. Vitruvius in his d
description of the basilica built by him at Fano, speaks of
a colossal order supporting the beams and of isolated piers
without entablature. If the columns could do without their e
entablature, this was when they supported arches. Yet we see
in the Roman Baths and other similar edifices columns bearing
arches or cross vaults, always possessing a useless entablat-
ure, but considered necessary as a decoration. Romanesque ar-
chitects renounced its use, either because they had under th-
eir eyes examples of monuments of the late empire in which a
arches rested their imposts on the capitals, or that their n
natural good sense indicated to them that in this case the e
entablature was no more than a useless member. And as they
scarcely ever adopted the platband in their structures, it r
resulted that they retained the antique column and always sup-
pressed the entablature. The columns of the Romanesque edifices a
are then deprived of this complement and possess only the base
and capital. The Corinthian order was that which had been al-
most exclusively employed under the empire, particularly in
the later time; so the Romanesque architects sought to imita-
te the capitals of that order by preference to any other. But
the diminution of the antique shafts and their entasis were
details of the art too delocate to be appreciated by rude men;
thus when they erected columns, they most frequently cut them
in perfect cylindrical form, i.e., they gave them the same f
diameter for their entire height. We must observe in passing,
that detached columns are preferably during the Romanesque e
epoch in provinces where remained considerable ruins of anti-
que edifices. In the southern provinces along the Rhone, Saone
and Marne, we find the detached column frequently employed as
a pier; while in provinces where antique traditions were more
effaced, columns are rarely used except when engaged on square
piers; they are then attached and receive the imposts of the
arches, or indeed on the exterior they take the placeo of but-
tresses and support nothing. (Arts. Architecture Religieuse,
Clocher, Construction, Eglise).

Among the Romans the column was scarcely adopted in the in-
terior as a necessary support, except in the basilicas. Roman-

employed these fragments as they could; they found it very si simple, when they erected an edifice, to seek among the ruins of antique monuments the shafts of columns, and to stand them in their new structures without taking into account their sizes or proportions, rather than to cut with great labor in t the quarries stones of great dimensions, and to transport them to the work. There resulted from theat collection of columns , or evem of fragments of columns of all dimensions and proportions, frequently in the same edifice,entire forgetfulness of the methods followed by the Romans in the composition of the orders of architecture. Eyes became accustomed to no longer establish these relations between the diameters and heights of columns, and no longer felt the need of observing the rules followed by the ancients. That barbarous forgetting, the result of the loss of the traditions of the very imperfect means of construction, the lack of competent workmen, caused the a architects of the first times of the middle ages to make the most singular blunders. For them the antique columns, frequently cut in precious materials, were an object of luxury, a sort of booty with which they sought to decorate their rude edifices, without often occupying themselves with the true function of the column. Further they were unable to cut a cylinder from a block of stone, and by a yet stronger reason could not sculpture the capitals or bases; it sometimes occurred that they placed the column on the ground without base, sometimes an a antique capital on a column whose diameter did not correspond to that of the shaft.Too inexperienced to dare to combine a system of construction resting on slender points of support, they placed the columns in reentrant angles, when they had torn them from the ruins of antique monumentr, or against massive piers, as a decoration rather than a support.

When Romanesque architecture developed and attempted to substitute a new art for the degenerate traditions of antique a architecture, they sometimes used the column as the Romans h had done, i.e., as a slender and detached monolithic support, sometimes as a cylindrical pier, thick and composed of courses, destined to bear a heavy load. It is certain that the detached column was employed by Romanesque architects quite otherwise than by the Romans. The Romans, unless in the last times of the late empire and in the architecture called Byzantine, gen-

One of the oldest that we know is a dovecot dependant on the abbey of S. Theodard near Montauban. This dovecot, whose appearance on two sides we give (9), is entirely built of bricks, terminated by a hemispherical vault pierced by a dormer with tracery. There is seen at A the wall reinforced by 3 solid t turrets, that are merely ornaments, rising above the covering and forming a shelter just mentioned. It must be stated, that in these provinces high winds regularly come from the same p points of the horizon, and thus that this shelter opposing t the invariable direction of violent winds is perfectly reasonable. A single door in the ground story gives entrance into the dovecot, which inside is equipped with nests arranged in the walls. A gutter with battlements and gargoyle accompanies the dome. This little edifice is only 15.1 ft. diameter by about 37.6 ft. from the ground to the tops of these pinnacles.[1]

Note 1.p.480. These drawings were furnished to us by M. Olivier, architect at Montauban.

The customary arrangement of the dovecots of Languedoc after the 16 th century is that of a square building crowned by a shed roof with copings, nearly always with pinnacles at the angles, so as to indicate this edifice to the pigeons. Here (10) is one of these dovecots, such as one finds in such great numbers in the suburbs of Toulouse and Montauban. Glazed tiles are inserted in the external plastering as shown at A, and prevent weasels from climbing to the opening reserved for the pigeons. Some are also built on four detached columns, so as to protect the pigeons from the approach of their implacable enemies. Four wooden beams placed on the four columns support the brick masonry, and a hole pierced at the centre of the fl floor, to which is raised a movable ladder, allowing entrance to the dovecot.

COLONNE. Column.

"A stone column placed on a base or plinth, receiving a capital at its top, employed in construction as a support of a lintel or arch." The architects of the middle ages did not have to invent the column. Antique monuments of the Roman epoch l left on the soil of Gaul an innumerable quantity of columns, for no architecture so lavished that sort of support, like the architecture of the Romans. Our first Romanesque constructors

the rows of nests, and the interiors of these are entirely c constructed of bricks; that material probably appeared warmer and less damp than rubble. The central pivoted axis is arranged as indicated in Fig. 6. The timbers A B are doubled and a are not in the same plane, so as to give a certain inclination to the two ladders raised before the door opening at the floor of the second story. Otherwise the dovecot of Nesle has the same dimensions as that if Creteil, 22.3 ft. internal diameter and 3.3 ft. thickness of walls. It is built with great care, and the entrance of the pigeons occurs through three pretty stone dormers arranged in the height of the roof, one at the east and the two others at the southeast and northwest.

Fig. 7 reproduces the external view of the dovecot of Nesle; its belts, cornice and dormers are of stone; the rest of the building on the exterior is made of rubble and plastered; the inside being of rubble properly dressed and fine bricks.

We represent one of these dormers (8); the builders took c care to place before it a projection, a sort of little balcony exceeding the projection of the cornice, that allows the pigeons to gather in a flock before entering the dovecot, which is one of their habits. One will even note that the two little projections B intended to protect them from the wind, when t they come to rest on the sill of the dormer. These two examples of dovecots of the northern provinces indicate sufficiently the care and study applied by the constructors of the middle ages to even the most ordinary structures.

There still exists at S. Jacques near Rouen a very beautiful dovecot built of bricks of different colors, and that belongs to the beginning of the 16 th century. These wooden dormers o open in the roof. Its arrangement recalls the dovecot of Nesle. Yet the upper story is supported by corbelling on the substructure, which gives that building a certain charm.

In the southern provinces dovecots take the circular form until the 16 th century, like those of the North; but their tops present a very peculiar arrangement, that belongs to these provinces; this is a sort of shelter designed to protect the pigeons from high winds, and to allow them to gather in numbers on the roof of the edifice. These dovecots are generally smaller than those of the northern provinces, but on the other hand are very abundant.

second story was reserved for the pigeons.

Here (1) is the plan at the level of the ground story. At A is the door of the stable, at A' that of the stairs, at B the windows, at C a trough, at D the stairs ascending to the dovecot, and at E being a stone column whose use is indicated in the section (2). As indicated by this section made on G H, a strong beam rests on the column and two stone corbels set in the wall. Joists rest on this beam and receive the floor. A vertical timber with iron pivots at each end , and forming t the axis of the round structure receives three triangles,to which is fixed a ladder necessarily inclined by the arrangement of the triangles, which are not in the same plane. This axis with its ladder by rotating allowed the farm people to easily reach all the nests, and to take away the squabs. At the level of the floor at K is a sloping hole through the wall, intended for removing the guano. The roof is hermetically closed inside by boards, now plastered. The interior of the tower contains 25 rows of about 60 nests each, which makes 1500 broods of pigeons. At each five nests is a sgall projection allowing persons taking squabs to set foot on them, so as to more easily proceed to that operation. A window and a dormer that gives entrance to the pigeons are the sole openings, that permit light and air to enter the interior of the tower.

Fig. 3 gives the details of the construction of the nests; the dovecot is entirely built of stone and rubble. On the key of the door is carved the shield of arms that we present in a sketch.(4). To complete the description of this curious structure, we give (5) its plan made at the level of the section. (Fig. 2).[1]

Note 1.p.485. We owe these drawings to the courtesy of M. Potoueille, architect.

Another dovecot is very similar to this, and belongs to the same epoch , and still exists at Nesle in a farm house near the church. The ground story of the dovecot of Nesle does not contain a stable, but a poultry house with 6 rows of nests. A stone colum rises at the axis as in the dovecot of Creteil, and supports a timber with pivots and X-braces receiving two ladders instead of one. The nests for the pigeons are more n numerous than at Creteil and number nearly 2000; they are built of rubble and bricks, i.e., a course of bricks separates

COLOMBIER. Dovecot. Pigeon House.

A building intended to contain flocks of pigeons, permitting them to lay, and to protect their eggs from storms.

During the middle ages, the construction of a dovecot was a privilege reserved to feudalism. The peasant could not have his own; he must bring his bread to the common oven of the c castle or the abbey, and pay a fine for having it baked. He was neither allowed to have a dovecot belonging to him. It w was with pigeons as with herds of beasts with horns or wool, they belonged to the lord, who could alone derive products from them. Flocks of pigeons being an income, those having t the privilege of keeping them sought all means suited to make the business productive. The construction of a dovecot was t therefore an important matter. Every castle possessed one or more dovecots; manors, houses of chevaliers, little castles w without towers or keeps could have a dovecot. It is unnecessary to state, that the abbots, all being feudal lords, and w who possessed the best administered agricultural establishments during the middle ages, had dovecots in the courts of the abbeys, in the farm houses dependant thereon, and the priories of obediences.

The owners of 36 arpents (acres) had the right to add to t their habitations, not a dovecot built of masonry, but a pigeon house of wood 16 ft. high and able to contain from 60 to 120 nests. By nests are understood the holes made in the dovecots and intended for the laying of eggs by pigeons. Hence th there came to be given the name of nest to the holes reserved in the masonry to receive the horizontal timbers of the horizontal timbers of the stagings and from these to the pieces of wood themselves. (Art. Echafaud).

Dovecots are generally built in the form of a cylindrical tower with a conical roof, well enclosed by thick walls and arranged internally with very particular care. We know several of them in the northern French provinces, that were built during the 14 th and 15 th centuries, and that are worthy of being studied. There exists one in a fhar house of the village of Creteil near Paris, Rue des Meches No. 14, which appears to belong to the last years of the 14 th century. It is built as a round tower and is divided in two stories. The ground s story was destined to contain animals, probably sheep. The s

to chill delicate souls, those best suited to become artists, men of letters and learned, among which study only penetrates by appearing covered by a pleasing exterior; Before applying the term barbarous to ages already far from us, let us cast our eyes on ourselves, and ask if an intelligent and sensible people, easily moved to good as to evil, if a people holding the first rank in the works of the mind, has need only of rods, bridges, broad streets, magnificent markets and splendid shops; if it be not necessary to bring up youths in sanitary establishments, well arranged and pleasing to sight, in which taste and art may take some part.

Note 1.p.481. Fellows are former students, who remain associated to the college by special prilege; the fellows retain for life the right of having a lodging in the college, of keeping a horse there and of receiving beer. These colleges at Oxford or Cambridge, maintain as many as 12 or 15 fellows.

The entrances of our colleges of the middle ages were elegant, decorated by statues of their founders. The student just shut up in these habitations consecrated to study did not experience that feeling of repulsion, which at first takes possession of ours today, when they find themselves before these bare and gloomy walls, that resemble the entrance of a penitentiary. At Oxford and Cambridge the entrances of the colleges are handsome monuments, elegant and covered by sculpture, protected by the images of the benefactors of those establishments; courts are surrounded by delicately wrought porticos or by buildings erected with luxury, refectories are large and high, well ventilated, those green lawns covering the yards, those fountains, loggias breaking the monotony of long facades, all enliven the imagination instead of depressing it. How many children there are in France, who leaving the paternal home, where all seems to be arranged to please the eyes, have experienced on entering a college this feeling of chill, which seizes on every delicate soul in the presence of ugliness and poverty? Assuming that our colledes had fellows, it is certain that not one in ten would ever return to the disagreeable and nauseating habitations in which they had to pass their first years of study. Let us look closer to our sulves always, when we wish to judge the past; if it be too full of abuses and prejudices, perhaps we are too full of vanity.

boarders, it was from the asylums open to the students from the province, that obtained the favor of being sent to Paris to study letters and the sciences. But they collected in the classes a very numerous attendance from the external lodgings outside, so that in troublous times this floating population was an actual danger to the city of Paris. Thus during the 1 16 th century most of the establishments were enlarged to contain boarders in greater number; but space was lacking in such a populous city, the buildings were successively added around the first nucleus, without its being possible to give unity to their combination. The colleges of Paris could never present an entirety of structures built at a single sourt, such as those we again see at Oxford and Cambridge in England. To those two cities it is necessary to go to get an accurate idea of what a college was during the middle ages, for the universities of Oxford and of Cambridge have retained nearly intact their immense revenues and maintain their old customs. Each of these colleges contains a vast chapel, a library, refectory, kitchens and their dependances, a lodging for the p principal, chambers for the students, lodgings for the associates or fellows,[1] halls, gardens, lawns, a brewhouse, sometimes a tennis court. All these great establishments were richly endowed and magnificently maintained, well located and surrounded by magnificent gardens, presenting the appearance of abundance and of quiet. If any reproach should be made to theg, that is to accustom young men to a princely existence; but English manners do not resemble ours. The colleges of Oxford and Cambridge seem to be made only for the elevated classes of society. Two hundred years ago, we fell in France into the o opposite excess; most of our colleges were established in old buildings, hemmed in, without air or verdure around them, built with deplorable parsimony, gloomy inside and outside, stories placed over each other, buildings beside each other, showing the students only bare and black walls, close and damp courts, dark corridors, poverty everywhere with its sad expedients, appearing to make regretted the paternal house ty the students, who must pass eight or ten years of their lives there. In those gloomy dwellings art did not enter and seemed excluded; everything striking the eyes of the youths was base, cold and disagreeable, as if these establishments were designed

S. Barbe, Jesuits and of Grassins, erected during the 15 th and 16 th centuries.

Note 1.p.478. This is a fact which must first overthrow persons, who for some unknown motive, will not admit a purely F French influence on the arts od the middle ages. That this i influence deranges the systems that they desire to cause to prevail is bad; but it would be well to oppose something other than trite phrases to facts, whose importance the entire world can scarcely recognize. That 13 th century, left to barbarism and ignorance, covered an entire quarter of Paris with establishments not only destined for instruction, but even to the gratuitous lodging of the poor students; incomes attached to these establishments were devoted to the payment of professors and to the board of the students. It is certain that a city which thinks of building colleges and of gathering within it students from every corner of Europe, even at the expense of its internal quiet, before thinking of straightening its streets, of erecting markets and abattoirs, of making sidewalks and sewers, is a city peopled by savages and leaving a pernicious example.

The city of Paris possessed besides these establishments s several public schools; the school of the Four Nations in Rue de Fouare, mentioned by Petrarch. In 1109 William of Champeaux had founded a school in Rue S. Victor. In 1132 there existed sevehal schools for Jews. In 1137 there was at S. Thomas-du-Louvre a school for 160 poor priests. In 1208 Etienne Belot and his wife gave an acre (arpent) of ground near the cemetery of S. Honorat to establish the college of Bons-Enfants. In 1415 was built the school of Law. In 1472 the school of Medicine uas erected in Rue de la Bucherie. The Ecole des Beaux Arts did not then exist; the plastic arts and architecture w were taught within the guilds, that had their traditions and their instruction. Of all these colleges, several at the end of the last (18 th) century retained some of their old buildings. In our own days we saw at the place now occupied by Library of S. Genevieve, the college of Montaigu, which presented some traces of its primitive arrangement.

The colleges erected during the 13 th and 14 th centuries did not have the dimensions, that must since be given to those establishments; they contained but a very limited number of

mansion in Rue S. Jacques to the establishment of a college. About 1325 Jeanne de Burgundy, queen of France, founded the college of Burgundy. In 1332 Nicolas le Candrelier, abbot of S. Vaast, founded the college of Arras for poor students from Artois. Andre Cnini, a Florentine, bishop of Arras, erected a college iu favor of porr Italian students. In 1332, eleven bursaries were instituted in this college by three Italian nobles. In 1333 Etienne of Bourgueil, archbishop of Tours, caused the erection of the college of Tours. In 1336 Guy of Harcourt, bishop of Lisieux, left by will a sum sufficient to rent a house suitable for receiving 80 students. In 1334 Jean Huban, councillor of the king, founded the college of Ave-Maria. In 1341 Pierre Bertrand, cardinal and bishop of Autun, erected in Rue S. Andre-des-Arcs the college of Autun. In 1343 Jean Mignon, councillor of the king, purchased several houses belonging to the old mansion of Vendome, which he destined for the erection of a college. In 1348 the three bishops of Langres, Laon and Cambrai left by will the sum necessary for the foundation of the college of Cambrai. In 1342 William of Chanac, bishop of Paris, instituted a college in honor of S. Michel for the poor students from Limousin, his province. In 1353 Pierre of Boncourt, chevalier, founded the college of Boncourt and Tournay. In the same year Jean de Justice, canon of the church of Notre Dame of Paris, purchased several houses in Rue de la Harpe to establish there the college of Justice. In 1359 Etienne of Boisse left several houses, located behind the church of S. Andre-des-Arcs, to be converted into a college. About the same epoch another college was erected behind the Maturins-S.Jacquesby master Gervais, physician of Charles V. In 1365 cardinal Jean de Dormans, bishop of Beauvais and chancellor of France, built the college called Dormans. In 1380 Michel of Dainville, canon and archdeacon of Noyon, councillor of the king Charles V, founded the college of Dainville. The same year the college of Cornouailles w was founded by Galeran Nicolas. In 1391 Pierre de Fortet, canon of Notre Dame of Paris, ordained that a college should be erected on his property. In 1440 the college of Trequier was established by William Coëtman, precentor of the church of Trequier. Let us add to this long list of foundations those of the colleges of Rheims, Coquerel, Marche, Seez, Merci, Mans,

Mathrins(S. Jacques), yet the students of the first rank, who marched at the head of the others, already entered into S. Denis.

From the 13 th century Paris became the city of letters, a arts and sciences in Europe. Students flocked there from England, Germany and Italy.[1] Students gathered at first in houses rented by the rectors or given by private men, and could soon assemble in establishments built to contain them. In 1252 S. Louis instituted the collego of the Sorbonne. Robert de S orbonne founded the college of Calvi. In 1246 the Bernardine monks of the order of Citeaux erected the schools of the Bernardines. In 1225 the abbot of Premontre purchased nine houses on Rue des Etuves in order to build in their place a collede for the religious. In 1269 Ives de Verge, abbot of Cluny founded a college above Rue de la Sorbonne for the religious of his order. Before the gate of Hotel-Dieu on the place Notre Dame existed . house in which were lodged 18 poor students. This foundation was transferred to before the college of Cluny. In 1269 William of Saona, treasurer of the church of Notre D Dame at Rouen, founded the college in Rue de la Harpe for 24 students. In 1280 Raoul of Harcourt, canon of Notre Dame of Paris, founded another college in Rue de la Harpe. In 1280 Jean Cholet, bishop of Beauvais, bequeathed 6000 livres to be furnished at the expense of the war of Arragon; but Gerard S. Just andEvrard of Nointel, his administrators, converted this legacy into the purchase of some houses near the Church S. Etienne-des-Gras, which they formed into a college. In 1302 cardinal J. le Moine established a college on lands located between Rue S. Victor and the Seine. In 1304 Jeanne, wife of Philip the Fair, founded the college of Navarre; this was one of the most beautiful colleges of Paris. In 1308 William Bonnet, bishop of Bordeaux, built the college of Bayeux. In 1313 Guy of Laon and Raoul of Prelles, secretary of Philip the Fair, established a college at the base of Mt. S. Hilaire for the p poor students from Laon and Strasburg. In 1314 Giles Aiscelin, archbishop of Rouen, purchased a site near the church S. Genevieve on which he built that since called Montaigne. In 1317 Bernard of Forges, archbishop of Narbonne, founded the college of Narbonne. In 1322 Geoffrey of Plessis, notary of Pope John XXII and secretary of Philip the Tall, devoted his mans-

du Fouare; then were founded the college of Bons Enfants, that of S. Nicolas-du-Louvre, and the college of S. Catherine-du-Val of the pupils. It was even permitted in 1244 to teach the sciences wherever desired, and on the houses that the masters found most commodious. But so that one of them should not dispossess his colleague of what he had rented, Innocent IV made express prohibitions therefor by two consecutive bulls, one given at Lyons of the second of the nones of March in the second year of his pontificate; the other seven years later and dated from Peronne on the third of the calends of June, with the command to the chancellor of the university to fix the rates of rent for houses where they dwelt. In all that time, and even until the reign of S. Louis, there had been no colleges at Paris, although we learn from Rigord in the Life of Philip August, and even from the Architremius de Joannes Hantivillensis, that in 1183 were numbered more than 10,000 students, and notwithstanding that, it is certain that they had no special quarter, and found themselves scattered from one side to the other of the city, like the schools of the masters; no person having the intention to found colleges or asylums not without reason; for the colleges built at first were simply merely to lodge and feed poor students. That since so many schools had been made there, this was only long afterwards, and to perfect what the founders had sketched out in a way."

Note 2.p.476. Hist. et antiq. de la ville de Paris. Vol. 2. p. 352 et seq.

But under the reign of S. Louis were founded and rented the colleges of Calvi, Premontre, Cluny and of the Treasurers. "But," adds Sauval, "since that time so many kings and queens, princes and bishops, besides rich and charitable persons, built others almost in emulation, there was insensibly formed a body, whose union caused this great quarter where they found themselves to take the name of university. Now by means of these colleges the entire quarter became so full of students, that sometimes they compelled both the parliament and those of Paris, even the kings themselves, to grant them their demands, although the matter were unjust. And from the fact that their number was so great, that in Juvenal des Ursins it is seen, that in 1409 the rector went in procession to S. Denis in France to allay the troubles, and while he was only at the

COLLATERAL. Side Aisle. Ambulatory of Choir.
Employed to designate the lateral or side aisles of churches. (Arts. cathedrale, Eglise).

COLLEGE. College. School.
An establishment intended for teaching letters, arts and sciences, erected by a special foundation. Sauval gives us curious details on the origin of these establishments in the city of Paris.[2] We indicated in Art. Architecture monastique some of the reasons, that determined rich abbeys to found colleges in Paris or other populous and powerful cities. Cathedrals ((Arts. Cathedrale, Cloitre) mostly possessed schools under t the shadow of their towers, some of which became celebrated. Until in the 12 th century teaching did not leave the enclosures of abbeys or episcopal churches; but already at that epoch it extended outside. Abelard was one of the first that t taught dialectics, theology and philosophy outside the schools then alone recognized, his success was immense; after having beaten his adversaries, he saw the number of his pupils increase constantly around his desk, until the time that Pope Innocent II forbade his teaching, confirming the judgment of t the council of Sens, that condemned the doctrine of Abelard. It does not enter into the scope of our Dictionary to treat of questions, which then divided the teaching world; it will suffice to indicate here the extraordinary movement of minds toward philosophical studies, a movement that in spite of the persecutions of which Abelard was the object, like all professors who assume to leave the routine ways, soon led prelates, abbeys and even private men to found at Paris chiefly a great number of establishments, half religious and half lay, opened to youths desirous to learn. Under Louis VII, the schools of the cloister of Notre Dame not being able to contain the number of students crowding there, the chapter of the cathedral of Paris allowed the pupils to pass over the river and establish themselves around S. Julian-la-Pauvre. There came to teach William of Champeaux, the master and soon after the unfortunate adversary of Abelard. From S. Julien the school of humanists and of philosophers was transferred to S. Victor. Si- "Since," says Sauval," the number of pupils from outside came to increase, the schools of the four nations were built in Rue

Note 3.p.412. From the doors of the facade of Notre Dame of Paris (beginning of 13 th century), from the cathedral of Laon 13 th century.

Fig. 7 gives several examples of these nails with washers; nail A came from the south door of the church of Schlettstadt, 12 th century; nail B in our possession , came from a door of Carcassonne, 13 th century; nail C from a door of Rouen; nail D from a door of the church of Flavigny. Men went farther, t they soon placed one washer over another, their contrasting forms presenting more varied designs and more apparent modeling. Especially dating from the 15 th century was this method employed. We possess two nails of that epoch fitted with double washers, which are real masterpieces; they came from demolitions.[1] One of them presents two superposed washers, each with a form inscribed within a square. (8). These washers are cut out and modeled by a very simple procedure. Strokes of the punch under the leaves gave them the swellings reproduced in our drawing. The head of the nail is finely forged and retouched with the graver. The other nail (9) of a later epoch has two washers, each inscribed within a triangle. Here the smith has put more art into the modeling of the leaves, and further he has retouched them with the graver. The head of the nail was chiseled hot and engraved.

Note 1.p.474. These nails were given to us by M. Boiche, lo locksmith at Vezelay; the engraving shows them full size.

Nails that hold ironwork, latches or door knockers, frequently have their heads wrought in the form of very delicately treated little figures. We give one of these nails, that dates from the 13 th or 14 th centuries, and which came from a church of lower Brittany.[1] Sometimes the heads of these nails for fixtures are in form of armorial shields, or they represent the muzzles of animals. (Art. Serrurerie).

Note 1.p.476. We owe this drawing to the courtesy of M. Goucherel.

The Renaissance retained these customs of industrial art in the least details of construction; they were lost only about the middle of the 17 th century. Yet one still finds, especially in the provinces, the trace of these traditions of the middle ages in the locksmith's work of the last (18 th) century.

of nails belonging to the last epoch, whose heads represént human masks of bronze.(2). Thisi antique traditions are lost about the end of the 12 th century, and thenceforth the simple or decorated nails were only of wrought iron. There still exist on the leaves of doors of the 12 th century a great number of nails with heads forged in diamong heads with shanks divided in two parts riveted on cross bars, as indicated in Fig. 3. That was a certain and strong means of fixind the planks of doors on the members supporting them, for then none knew of screws or bolts. Sometimes the heads of nails are forged in form of grains or pistils of flowers, as indicated by Figs. 4 and 4 bis,[1] divided and with facets (5),[2] conical,(6, 6 bis).[3] It was soon recognized that when nails were driven directly into wood to hold planks, and which did not rest on iron bands such as hinges, squares, etc., the head being driven by hammer blows injured the wood or did not fit exactly; then between that head and the wood was placed a round washer of wrought iron slightly modeled, the hollow next the wood, so as to form a spring, thus accurately fitting the heads of the nails to the planks, just as one now places washers under screws or bolts. But the smiths of the middle ages gave these washers varied forms; apparently more barbarous than those of our time, they did not think that a trade necessity should e exclude art as a useless superfluity. Dating from the 13 th century, the examples of nails furnished washers are so frequent and so varied, that we can only select some of the most remarkable. These washers consist of a small plate hammered very thin, pierced at the middle by a hole just large enough to pass the shank of the nail, whose head forces the washer to fit on the wood. That being nearly always concave next t the wood, it results that striking on the head of the nail to drive it, the edges of the washer were forced into the fibres of the wood, so as not to present on the surface of the wood any roughness or projections likely to injure the hands or collect the dust.

Note 1.p.471. This figure is full size.

Note 1.p.472. From the door of the chapel of S. Wenceslas at Prague (13 th century); from the cathedral of Laon (13 th century).

Note 2.p.472. From the door of S. Eusebe of Auxerre (13 cy).

removed at the end of the last (18 th) century. Therefore today these sanctuaries are enclosed in a scarcely suitable manner by woodwork without value or grilles of a miserable appearance.

CLOU. Nail. Ornamental Nail.

A pointed nail of iron with a head, intended to fix ironwork on wood or to hold together certain pieces of carpentry or j joinery. Grecian and Roman antiquity frequently employed nails as a decorative motive for wooden closures, and principally for doors. There is no architect ignorant of the nails of the bronze door of the Pantheon at Rome, those of the bronze doors of S. John Lateran. These nails have richly carved heads, that make them art objects of great value. That custom was followed in the middle ages, and there remain to us a great number of leaves of doors of that epoch, whose ironwork or plates of bronze are retained on the wood by nails with heads of remarkable work. Even when these little forged heads are of simple form, they always retain a trace of careful fabrocation. We have in our hands some nails taken from the decayed leaves of the great portal of the abbey church of Vezelay, which from the point of view of manufacture are of great interest, and are evidently of antique tradition. Then are composed (1) [1] of a head in form of a hemispherical shell, its hollow furnished with a long point. That head is very thin and with its nail is of iron, a second shell A is of bronze of the thickness of a playiug card, and exactly covers the iron head, so as to present externally the appearance of a bronze hemisphere. We believe these nails to belong to the 11 th century, t they are well made, and the bronze cap is perfectly fitted on the head of the nail. A spot of solder holds it on the iron. We think that the nail was first driven into the wood, and t that the bronze cap was then applied, for on it are noted no traces that the blows of a hammer would have left. Sometimes these bronze coverings of the heads of iron naisl are cast and chiseled, usually representing the muzzles of animals. Th The beautiful door covered by bronze sheets, that exists on the south side of the cathedral of Augsburg (a door most of whose panels belong to a very ancient epoch, 7 th or 8 th century), and which was restored in the 12 th, presents a series

seen from the interior of the choir as well as the side aisles. (Art. Ghoeur, Fig. 1). A rich base decorated by arcades supports them. According to custom, the architecture and statuary of the enclosure of the choir of Notre Bame of Paris were painted and gilded. The choir of the cathedral of Bourges was enclosed about the same epoch; there remain only very beautiful fragments of this enclosure, now deposited in the crypt. The choirs of the cathedrals of limoges and of Narbonne are still partly enclosed by the tombs of bishops. It was the s same at Amiens. Besides the tombs at Narbonne may still be s seen the remains of an architectural enclosure of the 14 th century, one bay of which we give (7). This fragment of the enclosure, placed on the axis of the sanctuary, was entirely painted.

Note 1.p.468. See Corrozet, Du Breul, and the Description de Notre Dame de Paris by MM. de Guilhermy and Viollet-le-Buc. Bance. 1856.

Later these enclosures were sometimes executed in wood. The 15 th and 16 th centuries erected very rich ones. The enclosure of the choir of the cathedral of Chartres was almost entirely executed at the beginning of the 16 th century, and is one of the most remarkable. Mutilated by the chapter during the last (18 th) century, ts furnish the interior of the choir with the heaviest imaginable decoration, the external face is alone preserved, As at the cathedral of Paris, it represents the history of Jesus Christ divided in compartments, in which are carved scenes in high relief. That enclosure is of stone, executed with a prodigious delicacy and richness of details. At Amiens may still be seen behind the beautiful stalls of the beginning of the 16 th century an enclosure in p painted stone of the same epoch, representing on the south side the history of S. Firmin, and on the north the history of S. John Baptist. That enclosure is on a very bad style, y yet is very interesting on account of the quantity of costumes found there, faithfully copied from those of the time to which belong these sculptures. There are none, who do not know the beautiful enclosure of the choir of the cathedral of Alby, w which dates from the first years of the 16 th century.(Art. Jube). The 17 th and 18 th centuries say destroyed in our cathedrals most of those stone enclosures, at least around the sanctuaries; they were replaced by grilles more or less rich,

were in the church of S. Denis of abbot Suger very beautiful grilles of wrought iron of which still exist some fragments, and we also see around the sanctuary of the abbey church of S. Germer iu Beauvoisois the grilles, that served for enclosure, and which date from the beginning of the 13 th century. Until during the last (18 th) century, the monastic churches suppressed as much as possible the solid enclosures to replace them by open ones of stone, wood or iron; yet one finds in some porr remains of solid enclosures around choirs. The abbey church of S. Seine in Burgundy has retained its enclosure of rude masonry, covered on the exterior by paintings from the beginning of the 16 th century representing the history of S. Seine.

Note 1.p.467. There is frequent mention of sanctuaries with double enclosures in churches of the first time of the middle ages; Galbert in the Vie de Charles le Bon, written in 1130, Chapter 4, expresses himself thus:- "In the first sanctuary Baudoin, chaplain and priest, and Robert, clerk of the count, concealed themselves near the altar; in the second sanctuary had taken refuge Ogier, clerk, and Frumold junior, Syndic, a and Arnoul with them. Ogier and Arnoul were covered by a rug, and Frumold concealed himself under a cluster of branches. Then the servitors introduced into the sanctuary, searching and turning all the curtains, mantles, books, rugs and the b branches, that the monks were accustomed to bring every year on Palm Sunday."

CLOTURES DES CHOEURS DES CATHEDRALES. Enclosures of Choirs of Cathedrals.

In France choir enclosures existed in the primitive cathedral churches; but when in the 12 th century the French bishops rebuilt these monuments on much greater plans and according to new programmes, it does not appear that they thought of c closing the choirs by fixed enclosures. (Art. Choeur). One of the most ancient is that, whose fragments remain behind the s stalls of the cathedral of Paris; it was commenced in the last years of the 13 th century, and completed in 1354 by Jean le Bouteillier.[1] That enclosure represents the history of Our Lord arranged in compartments, forming a series of scenes in high relief between the piers of the choir. These scenes are behind the stalls and are only seen from the side aisles; but around the sanctuary they are entirely perforated so as to be

arcuuum." This gallery seems to be a double enclosure, behind which opens the eastern apse, whose altar P is dedicated to S. Paul and is surrounded by a circular bench and consequently by the enclosure. In the two transepts R R are two altars dedicated to Ss. Andrew and James and Philip, altars with their enclosures. Each bay of the sides aisles is provided with an orientated altar with enclosures dividing these bays into chapels. On examining this plan, it is easy to see why the p people could not circulate freely through all these obstacles, and how the church was entirely reserved for various religious services, i.e., was almost solely occupied by the monks. These are arrangements which the abbot sought to modify later, as appears in studying the plans of churches of the orders of C Cluny and of Citeaux, and that the French bishops of the 12 th and 13 th centuries absolutely abandoned in the construction of their new cathedrals by motives derived before. This movement of the high French clergy was not equally followed in t the entire West, and the German or Rhenish cathedrals still retain certain arrangements recalliug the enclosures of the Carlovingian monastic edifices. Thus the cathedrals of Bamberg and of Tours, provided with two opposite apses like all Rhenish cathedrals, have still retained the enclosures of the 11 th and 12 th centuries, of stone and richly sculptured; they indicate to us the form and decoration of the enclosures of the abbey churches. For lack of similar monuments existing in france, one can have recourse to the monuments just cited. That of the eastern choir of Bamberg consists of a wall built between the piers of the sanctuary, in the base of which are pierced windows to light the crypt. An arcade forms the principal decoration on the exterior, and under each arch are sculptured two figs of apostles of about 3.6 ft. height, in the grand style, although already labored. These apostles appear to argue; each has a scroll unrolled in his hand. All that d-decoration was painted and the columns were gilded. It is to be regretted that we have not preserved in France any enclosure of that peeiod, for it is not doubtful that these internal works must have been very beautiful and treated with great c care. There only remain to us in some monastic churches iron grilles of a later epoch, i.e., executed when the abbots desired to allow the choirs of their churches to be seen. There

desiring to resume the importance that the great abbeys had c caused them to lose, erected on nearly the entire area of France vast cathedrals, whose internal arrangement contrasted with that of the monastic churches,in that on the contrary they left considerable space for the multitude, and that the ceremonies of the worship performed at a single altar open at all sides could be seen by a great number of persons present. (Arts. Cathedrale, Choeur). This observation was suggested to us by a careful study of the enternal arrangements of churches of the middle ages, to which we attach a certain importance, since it partly explains to us the prodigious movement, that caused the rebuilding of cathedrals on vast plans at the end of the 12 th and the beginning of the 13 th centuries, cannot be based on an older or more authentic document, that that j just mentioned, the manuscript plan of the abbey of S. Gall. The church comprised in that plan, like the Rhenish churches, has two apses, one at the West and the other at the East.

Note 2.p.485. Art. Architecture Monastique. Fig. 1.

Here (6) is a reduced copy. Believers entered by the western apse provided with double side aisles A A. They were stopped by the enclosure around the altar dedicated to S. Peter and by barriers B B, giving admission to the two aisles C C, of the nave. A circular bench for the religious was raised two steps and surrounded the altar E of S. Peter. A first choir enclosure is placed at F; then one finds a second enclosure around the baptismal font G, at the east of which is an altar dedicated to S. John Evangelist. About the middle of the nave rises at H. A third altar dedicated to the Saviour and surmounted by a great crocifix; this altar is enclosed. Then comes the great choir divided in several parts;[1] the first contains the pulpitI for reading the gospels. Two other pulpits K precede the second choir anclosure reserved for the offices of the night. On the axis at the eastern end of that second enclosure is t the descent to the court, containing the remains of the saint; two small altars are placed at L L at the two sides of that descent. Seven steps M ascend to the sanctuary on the right and left of the entrance to the crypt. Two other descents give access to that crypt at N N. The principal altar O is dedicated to the Virgin and to S. Gall, and is surrounded by a gallery designated on the drawing by the words (involutio ar-

goodness of their fruits, from which they derived considerable profit.

Note 1.p.463. Frodoard. Chapter 19.

Note 2.p.463. Plans of abbeys. Library of S. Genevieve.

Around manors or the country houses of simple citizens, live hedges alone frequently served as fences, and they were maintained with great care. The culture and pruning of the hedges of the houses of nobles were at the cost of the borders.

CLOTURES DISPOSES DANS L'INTERIEUR DES EGLISES MONASTIQUES.

Enclosures placed within Monastic Churches.

There now remain no traces of the numerous enclosures, that divided the interiors of monastic churches. During the first centuries of the middle ages, enclosures were placed around each altar. Frodoard [1] mentions the altar, that the archbishop Herivee of Rheims "erected and consecrated in the middle of the choir of the cathedral in honor of the Holy Trinity, and that he surrounded by slabs covered by silver plates." From the 12 th century it appears that the numerous enclosures dividing the interiors of churches were suppressed, probably to leave more room for the faithful; for dating from that epoch, the texts and the monuments rarely indicate more than enclosures of choirs or of sanctuaries.

Note 1.p.465. Frodoard. Chapter 13.

The plan of the abbey of S. Gall, [2] so interesting to consult when one desires an idea of what a great monastic establishment was in the 9 th century, shows us in the church a great number of enclosures so arranged, that the space reserved for believers must have been very restricted, unless they were o only called into the church on the occasion of a particular ceremony, in which case they must be admitted inside several of these enclosures. Religious customs evidently were successively modified after that disten epoch. Then the different parts of the church were not open all day as they now are in France, the believers desiring to pray in the House of the Lord could not walk around everywhere, they remained near the entrance within quite a limited area. Already in the 12 th c century the religious regulars had felt the need of modifying that state of things in the midst of a people, whose less ardent devotion needed to be sustained by the spectacle of grand religious pomp. About the middle of that century the bishops,

Wattle-work is frequently represented in the manuscripts of the 14 th and 15 th centuries, and appears to be executed with particular care, frequently made of split wood and of branches of trees interwoven in lozenge form.(2). At certain distances branches A being set at a certain distance from the wathle and connected with it shored it in a vertical plane. Other more simple fences were composed of horizontal poles on rustic supports very skilfully joined, as indicated in Fig. 2 bis. These kinds of fences were especially employed to fold flocks; by removing the horizontal poles, the animals were fr free. One yet finds in mountain provinces field fences very industriously built and stable by means of the simplest combinations, particularly in the Tyrol, which has retained most of the customs of the middle ages.

Kings, rich nobles or abbots and priors sometimes enclosed their gardens and orchards by stone walls."Philip August caused the enclosure," says Corrozet,[1] of the park of the forest of Vincennes by high walls, and placed therein the waterfowl sent him by the king of England." There remain fragments of the beautiful enclosures of abbey gardens. These walls are built of cut stone with turrets at the angles to watch the flanks of the walls; sometimes their tops even have battlements. The custom of surrounding monasteries and their dependances by enclosures is very ancient. Frodoard relates that Seulphe, archbishop of Rheims, and caused the monastery of S. Remi with the churches and adjacent houses to be surrounded by a wall, and established there a strong castle."[1] There still exist portions of the enclosure of the park of the abbey of Marmoutier near Tours, which are very beautiful and well built. That enclosure was composed of a wall strengthened at certain distances by internal and external buttresses, giving in plan Fig. 3 and Fig. 4 in perspective. It was built 14 to 20 ft. from the ground, but here the buttresses could only have been utilized by building wooden platforms inside, that could be done in time of war. The enclosure of the priory of S. Marie of Argenteuil has been preserved to us in an engraving of the last (18 th) century.[2] We reproduce here a portion of it (5) giving an angle and the middle of one side with flanking turrets. These enclosures sheltered inside fruit trees arranged on walls, and many religious houses were famous for the good-

within his walls. After Philip August the walls of the fortifications were always built at the expense of the Parisians. The successors of that prince gave them to the provost of the merchants and the aldermen, they entrusted to them the guarding, inspection, management, and the care of repairing, rebuilding and changing them."

The lay nobles, bishops and abbots were frequently gathered in the same city, and each had feudal rights extending over certain parts of the city, these rights were circumscribed within certain enclosures, designated by the names of "domain of the bishop, of the count, of the abbey." The inhabitants possessing properties outside these enclosures also had their enclosure, the ramparts of the city built and maintained at their cost. One understands now such a division must produce conflicts. For example, at Rheims within the walls of the city were enclosures of the secular lord that held the castle, that of the archbishop, that of the chapter of the cathedral, and that of the abbey of S. Remy. Sometimes a narrow street separated two enclosures and men fought from one wall to the other, some yards apart.

In the country armies surrounded their camps by enclosures according to the Roman tradition. (Old French poem).[1]

Note 1.p.460. Roman du Renart. Verse 5725 et seq.

Sometimes a wooden enclosure was movable, could be removed in sections and transported with the army, when it changed i its camp.

CLOTURES DE PROPRIETES. Fences of Lands.

Gregory of Tours relates [2] that a man had built an oratory to S. Martin with interlaced branches, and that he had established himself with his wife in that arylum, which was really but an enclosure composed of wattles.

Note 2.p.460. Hist. Franc. Book VIII.

During the middle ages as in our time, gardens, orchards a and meadows were enclosed by wattles or palisades. (Old French poem).[1]

Note 1.p.461. Roman du Renart. Verse 4943 et seq.

If one refers to the vignettes of manuscripts, palisades we were composed of pointed stakes set in the ground with spaces between, connected at bottom and near the tops by flexible b branches as indicated in Fig. 1.

a part of these vast rooms. This word is also understood as meaning a little chamber, cabinet or recess.

(Old French poem.).[1]

Note 1.p.459. Roman du Saint-Graal, published by Francisque Michel. Verse 2031.

The movable screens are still so called. (See Dictionnaire du Mobilier. Art. Paravent).

CLOTURE. Fence. Enclosure. Grille. Chancel Rail.

An obstacle of stone or wood surrounding fields, public or private buildings, or also a certain part of an edifice. We shall divide this Article into:- 1, external enclosures of ci- cities or market towns; 2, enclosures of private properties; 3, enclosures of the choirs of churches.

CLOSURES DE VILLES. Enclosures of Cities.

During the middle ages the construction, maintenance and g guarding of the enclosures of cities were usually left in cha- rge of the inhabitants; but still when a lord claimed to have feudal rights over a city or a part of a city, he established an enclosure at his own expense; then all the area comprised within that enclosure was under his jurisdictiou. William le Breton and Rigord affirmed that Philip August purchased all t the lands needed by him to erect the walls of Paris' so on t the charters of his time these enclosures are called "walls of the king." "Besides,that," says Sauval,[2]"in a decree of 1 1261 the parlaiment terms the walls of gate S. Marceau,"walls of the king." In a word, this is the name taken by the walls of Paris in 1273, 1280 and 1299, in two agreements between t the king and S. Merry, the other between Philip the Bold and S. Eloi; and in the permission given to the Templars to build at the gate of Chaume. Further," he adds,"after Philip August had completed his walls, he claimed to be the lord of the la- nds and places that they enclosed, and for that in the univer- sity, he desired at first to take from the abbot of the reli- gious of S. Germain the administration of justice and the ju- risdiction of what he had just endowed; he did the same in t the city with regard to the bishop of Paris and the lordship, both of the old and new city of S. Germain, as of the new and old enclosure, i.e., of the quarters of S. Germain l'Auxerrois, of S. Honore and of S. Eustache, which he had also included

resting on three feet is more stable, than if it rests on two or four. Now the portico of the cloister of the abbey of Mont-S. Michel is only a series of tripods.

Here (42) is a section on O P, and (43) is an internal elevation of these arcades. The mouldings and the ornamentation recall the actual Norman architecture of the 13 th century. T The capitals are simply turned according to the Anglo-Norman mode, without foliage or crockets around the bell. The capitals of the arcade attached to the wall above are decorated by bastard crockets. The spandrels between the arches of the interior of the portico present beautiful sunken rosettes, figures, the Lamb surmounted by a canopy (Fig. 43), then above the arches being a frieze with scrolls or little rosettesod beautiful work. Between the imposts of the diagonal arches of the little vaults are carved crockets. This cloister was completely painted, at least the interior and between the two rows of 1 little columns. At B (Fig. 40) is the sole entrance from the porticos of the court, although it would be easy to climb over the low wall between the little columns, and this court is e entirely covered by sheets of lead, intended to collect the rainwater in a great cistern reserved beneath the church. Under the cloister is built the hall of the chevaliers, composed of a group of columns. (Art. Architecture Monastique, Figs. 1 18, 19); beneath the hall of chevaliers is a lower story. Thus the cloister of the abbey of Mont-S.-Michel-en-Mer is situated at the top of an immense edifice, and its porticos are borne by vaults; that is why it was arranged to give this structure an extreme lightness.

The Renaissance erected some pretty cloisters, but which or present no peculiarity worthy of notice. The ganeral arrangement of cloisters after the 13 th century vary little in France, as we have already stated, and the details of the architecture alone are modified according to the taste of each epoch. These details find their places in the Dictionary; it is therefore useless to mention them here.

CLOTET. Enclosure. Screen.

During the 13 th, 14 th and 15 th centuries, the name of sc screen was given to a wooden enclosure established in the great halls of castles to protect a bed from the wind, or only

to this rule, especially in the southern provinces.

Note 1.p.452. We owe the drawings of this cloister to the c courtesy of M. Acoux, architect at Bordeaux.

Thus the cloister of the cathedral of Narbonne, which dates from the first years of the 15 th century, is composed of a s series of arches without tracery, separated by thick buttresses. Fig. 38 presents the plan of a quarter of this cathedral. A A we give the horizontal section of the corner pier, and at P that of one of the other piers at the scale of 1 : 50. Fig. 39 shows in perspective an angle of this cloister.

The cloister of Narbonne posserses a low wall; the arches are high, contrary to the custom of the builders of the Middle ages; it is covered by stone slab terraces, protected by a b balustrade, like the cloister of the cathedral of Beziers, wh which dates from the 14 th century.

The cloisters of the 15 th century generally differ from those of the 14 th only by the decoration of the buttresses, t the compartments of the tracery, the construction of the vaults, and the details of the architecture. Hence it is not necessary to occupy ourselves with them here, since we shall find t these details in the different Articles of this Dictionary.

We shall close what we have to say on these monuments by the description of the cloisters of the abbey of Mont-s-Michel-en-Mer, one of the most curious and most complete among t those possessed by us in France.

We give the entire plan of this cloister, having a view of the sea on the side A by oblong and very narrow windows (40). The arcade consists of two rows of little columns, staggered as indicated by the detail of the angle of the plan (41). Pointed arches rest on the little columns, from A to P and B to C on the exterior; from D to E and E to F in the interior; and very acute diagonal arches are turned from A to D, A to E, E to B, B to F, F to C, etc.; the triangles left between the a archivolts and the diagonal arches are filled like the sfandrels of ordinary vaults. It is evident, that this system of little staggered columns is more able to resist thrust than the mode of twin columns, for the diagonal arches A D, A E, E B, etc., oppose a double resistance to these thrusts, staying the construction and rendering stable the two rows of columns. Besides it is unneccesary to say, that the weight rest-

of the beautiful windows. One cannot desire too much to see at last this magnificent specimen of a cathedral cloister rid of services, that nothing prevents from being placed elsewhere.

The arrangements of cloisters adopted from the beginning of the 13 th century vary little until the middle of the 14 th; these are always square vaults, whose external side arches are filled by tracery glazed in the upper part, or without glass. In the 14 th century the cathedral and monastic churches being less rich than they were in the 13 th, returned to cloisters composed of continuous arcades, like the primitive Romanesque cloisters, whose porticos are covered by visible carpentry or wooden ceilings. But that system of construction is no longer that of the Romanesque cloister. The archivolts composed of voussoirs often disappear and are replaced by openings, that much resemble a great balustrade. The south side of the cathedral of Bordeaux has retained a cloister built according to that method; it dates from the 14 th century. One of its four porticos is connected to the isolated buttresses of the cathedral, the other three are free.

Fig. 36 presents the plan of an angle of the cloister of t the cathedral of Bordeaux. At A we have traced the horizontal section of one pier at the scale of 1 : 20. On a continuous low wall rise clusters of columns with much greater depth than width. These piers are cut in a single block of stone, and th they bear an arcade with each triangle cut in a single block, as indicated by Fig. 37, which gives the elevation of the section of the cloister of the cathedral of Bordeaux. A cornice composed of long blocks of stone connects the whole; a modern addition of two courses of stone loads the light structure. B But formerly, as proved by the presence of gargoyles still in place, the cornice bore a gutter on which rested the carpentry; we have believed it necessary to restore the primitive condition in our Fig. 37.[1] The visible carpentry was composed of a series of braced rafters, retained by anchors fixed on the corbels. This kind of construction did not offer great stability; hence most of these cloisters were overthrown by the thrust of the carpentry without tiebeams, and in the 15 th century men resumed the method adopted by the 13 th century, i.e., returned to cloisters vaulted with tracery under the side arches, and this tracery was glazed. Yet there are exceptions

even for the sanitation of the cathedral of Langres, it is p probable that one will pay dearly for that sale.

But the most beautiful cloister preserved to us (at least o in part) and possessing a second story is certainly the cloister of the cathedral of Rouen. That structure dates from about 1240, and its entirety and its details are executed with great luxury and minute care.

Fig. 34 gives us the elevation of one of the bays of the c cathedral of Rouen. These bays are wide, pierced at the base by four free arches borne on monolithic little columns. Above these arches the opening is glazed. The archivolt is thick, composed of two rows of voussoirs, the upper serving as a side arch for the internal vaults. These archivolts support a great slope penetrated by the piers and mullions of the twin windows of the second story. A cornice with a double row of crockets and a balustrade, whose quatrefoils alone are perforated and crown the second story, which bears the gutter. At the middle of the head of each buttress, entirely without ornament, projects a gargoyle casting outside the water collected in the gutter. Pinnacles surmounted these buttresses, but were unfortunately destroyed.

Here (35) is the plan of these buttresses and of one bay of the ground story. One sees the simplicity and lightness of t this construction. The entire resistance consists only in these buttresses and the square piers against which they abut. As for the opening, it is independent of the structure proper. There is no need to say, that this little cloister is covered by cross vaults, composing a series of bays of oblong plans; this is an arrangement generally adopted for cloisters in the 13 th century and followed later. The second story existed at only one side of the cloister, and contained the library of the chapter; it formed a great hall covered by ceiled carpentry. [1]

Note 1.p.451. The remains of this cloister fell into ruin because of a series of overloads on the vaults, and the neglect to which this precious architectural ruin was left. The Ministry of Worship a short time since furnished MM. Barthelemy and Desmarets, diocesan architects of Rouen, with the means of r restoring the parts most damaged. But the lodgings are established in the second story and aid in destroying what remains

rainwater in a cistern placed beneath the court. It sometimes occurred then, that instead of discharging the water directly on the area of the court, and to avoid carrying filth into t the cistern, drain pipes of stone were placed at certain distances in the angles formed by the buttresses. (Art. Conduite); or if gargoyles were adopted, which was the most common case, a stone channel was placed below them entirely around the court, to collect the water and convey it to the cistern through openings. Sometimes this channel was a little subterranean gutter having an opening with grating under the mouth of each gargoyle. More rarely the area of the court was paved with s slabs like the area of the antique impluvium, and it conducted the water into the cistern by slopes toward the middle. Thus was collected not only the water falling on the roofs, but a also that received on the entire area of the court. The court od the cloister of the abbey of Mont-S.-Michel-en-Mer is covered by lead; but we shall soon have occasion to speak of that remarkable cloister.

Still certain cloisters of cathedrals in the 13 th century were particularly surmounted by a story, probably because of the small area at command around these monuments erected at the centres of populous cities. There exists at Langres the ruins of a cloister of that kind, which is not an a very good style and belongs to the middle of that century.

Fig. 33 presents one of its bays. A second story, pierced by a small rectangular window over each arch, was perhaps intended for the lodging of the canons. Here the side arches of t the vaults served as archivolts of the opening as at Noyon. The rear wall of the cloister of the cathedral of Langres is decorated by a triple arcade beneath each side arch, supported by little columns and capitals admirably carved. As for t the buttresses, thick and projecting for the height of the gr ground story to abut the thrust of the vaults, they are sensibly reduced for the height of the second story, which was covered only by carpentry.[1]

Note 1.p.449. This cloister no longer belongs to the cathedral; it was sold by the domain twenty years ago; it now serves as a warehouse for dealers in grindstones. We do not know what the domain received for the sale; but when it is desired to repurchase this cloister, which will be neccessary some doay,

the luxury of the monks. A poet of the 13 th century received at the court of S. Louis, Rutebeuf, did not lack an opportunity to exercise his wit against the religious orders. One will judge it by this passage taken from the "Vie de Sainte Elysabel:- (old French poem).

A Huguenot could not have spoken otherwise in the 16 th century.[1]

Note 1.p.448. Oeuv. comp. de Rutebeuf, collected by A. Jubinal. Paris. 1839. La vie de sainte Elysabel. Vol. 2. p. 218.

To cover the naked internal walls of the porticos between the corbels supporting the vaults, they were decorated by paintings and even sometimes by reliefs and arcades. The cloister of the cathedral of Toul, commenced about 1240 and completed at the end of the 13 th century, gives us a pretty ornamentation of that kind, consisting of a series of trefoil arches, beneath each one being sculptured a little relief borne on a sort of slightly projecting slab.

We give (33) one of the internal bays of this cloister.[2] On the exterior, the cloister of the cathedral of Toul presents the arrangement analogous to those of the cloisters of Noyon and Soissons, except that the side arches do not extend through the thickness of the wall, and that the archivolts of the openings are turned within these side arches. Thus at each s side of the buttresses remains a part of the pier. This arrangement is less frank than that of the cloisters presented above. Besides the portico was not glazed. At Toul the gutters of the cloister are arranged in a special manner; above the cornice they consist of a course of stone cut according to t the slope corresponding to the discharge of the water, which occurs by gargoyles pierced at the middle of the head of each buttress. (32).

Note 2.p.448. There remain no traces of the reliefs destroyed at the end of the last (18 th) century. M. Boeswillwald kindly furnished the drawings of this cloister.

Until about the middle of the 13 th century, the roofs of cloisters with rare exceptions discharged the water directly on the court without gutters; the presence of gutters is an improvement later introduced in the construction of cloisters. In localities where spring water was lacking, men profited by the roofs of the cloisters and adjacent halls to collect the

One can observe here the difference betweem the two Burgundian and French schools, the first is bold and elegant with a mixture of rudeness, employing resistant materials and knowing how to use the advantages resulting from their nature, the o other refined and sober, avoiding exaggerations and eccentricities. Yet it is necessary to believe that the architects of the French provinces would have adopted such a simple design of their cloisters. The love of luxury, depressed for the instant by the Cistercians, resumed a new flight at the beginning of the 13 th century among the regular religious. At that epoch in France, Italy, Spain, Germany and England, the monasteries saw arise cloisters competing in extent, richness of materials and sculpture. In Italy men then erected cloisters of marble, covered by sculptures and mosaics, of S. Paul-within-the Walls, of S. John lateran, at Rome; in Sicily the admirable and immense cloister of Montreale, a singular mixture of Norman architecture and or Moorish tradition; in France, t the beautiful cloisters of S. Leger and of S. Jean-des-Vignes of Soissons. We shall occupy ourselves with the last cloister, in which the religious, while remaining faithful to the principle applied with such great sobriety at Noyon, displayed u uncommon luxury of sculpture.

We give the plan (29) and the external elevation (30) of o one bay of the cloister of S. Jean-des-Vignes, contemporary with that of Noyon. The portico of the ground story was probably surmounted by a story that exists no longer. The buttresses, the tympanums between the archivolts are covered by s sculpture. The plan presents a multitude of little columns, whose function is determined by the arches of the vaults, and which are crowned by capitals finely wrought, whose connection forms both in the interior and exterior of the portico a series of brilliant ornaments. The vaults at the wall side as at Noyon, are supported by corbels springing from human heads. As for the openings, the roses alone were glazed.[1]

Note 1.p.444. The drawings of this cloister were given to us by M. Boeswillwald, diocesan architect of Soissons.

That richness so greatly contradicted the principle of the religious orders, that it did not fail to arouse already in the 13 th century blame or ridicule. One is too much disposed to believe that the 16 th and 17 th centuries alone criticised

entirely distinct from the glazed rose, as in transitional c cloisters, such as those of Fontenay and Fontifroide. That ar arrangement was not long retained; soon the entire space comprised between the side arches, piers and base wall, was filled by tracery, but this tracery was notientirely glazed like the windows of the side aisles of a church. Men were at first content to glaze the upper compartments and to leave open the spaces between the light columns. There exists a cloister of that kind, a charming arrangement, at the south side of the collegiate church of Semur-en-Auxois. It is very small, since each side contains only two bays.

Here is its entire plan (25) at a scale of 1 : 20. Profiting with rare intelligence by the equal thrusts, that at the angles act in the opposite directions and therefore neutralize each other, the architect instead of giving to these angles a considerable thickness, as in Romanesque cloisters, composed the pier of six little columns connected together and made of a single block of stone. This pretty arrangement gives an extraordinary lightness to this cloister, while retaining a perfect solidity for it. The sole resisting points of the c composition are the four buttresses placed at the middle of e each face of the porticos and dividing these into two bays. A well is dug at the centre of the little court.

Fig. 26 presents the section and elevation of one bay of t the cloister of Semur, as well as a detail of the piers at A. The intervals between the little cloumns not being glazed, w while the compartments of the tracery above the arcade were so.[2] Thus were obtained much larger openings for lighting the porticos, than in the Romanesque cloisters, neither rain nor wind could injure the persons walking beneath the porticos. The roses and openings of the glazed tracery formed transparent screens opposed to the wind and sun. The sculpture of the capitals is very beautiful, broad and abundant, and the materials of the piers are of large dimensions, according to the Burgundian custom. This cloister is of the time of the church, and must have been built between the years 1230 and 1240.

Note 2.p.489. This cloister is today built into later structures, and in part destroyed; yet sufficient of it remains to give a complete idea of the general arrangement, of its construction and of its details.

Note 1.p.437. M. Ruprich Robert kindly entrusted to us the studies that he made of this cloister; they served to give us these illustrations.

Let us now return to the cloisters of the Gothic epoch; after all the Romanesque cloisters offer but few varieties, and what we have given suffices to afford a tolerably complete i idea of this sort of structure. It is not the same with cloisters erected during the Gothic period, particularly at the t time that art commenced to develop itself. For the architects of the 13 th century the programme of a cloister was a precious theme, of which they could make the best use. The orientation, the arrangement of a cloister in regard to its appendages, the needs peculiar to each community, the nature of the materials, the necessity for enclosing some portion, of leaving the rest open, the removal of rainwater, the means of collecting this water in cisterns, all that must and did arouse the inventive genius of the architects of that epoch. It would be difficult for us to omit nothing, in the midst of so many ruins to be regretted (for these dependances of our churches have nearly all been transformed, devastated or demolished); however at least we shall attempt to make known the successive modifications applied to these structures, and to present the most complete and most remarkable examples, that time and the hand of man nave not destroyed. The cloisters still standing, abandoned and unused today, mostly very lightly constructed, tend daily to disappear, and our labors may perpetuate for study, works of which soon will no longer remain a trace.[1]

Note 1.p.439. On examining our notes, we are compelled to recognize, that since the time that some of them were made, examples of cloisters still existing some years since are now destroyed. One should no be surprised by this; life has long since retired from these dependances of churches, and already much before the last years of the last (18 th) century, most cloisters of cathedrals and abbeys were abandoned, as structures with no longer any reason for existence.

We have already seen, that at Laon the constructors had glazed the upper openings made beneath the side arches of the v vaults of the cloister, and had left the lower arches open, l like the old Romanesque porticos. But at Laon, although this cloister was already Gothic in its vaults, the lower openings

column C will be set vertical, while the little column D will be set inclined 0.8 or 1.2 inch from G H. The double base I being made of a single block of stone, as well as the double capital K, the two little columns thus form an actual shore resisting the thrust acting in the line L M. In spite of these precautions based on very correct observation, time, neglect and the weakening of the carpentry, badly maintained and decayed, still caused the overthrow of most colonnades of Romanesque cloisters covered by wooden ceilings. But what has permitted us to state this interesting fact, is that the centres of the bases in plan are almost farther apart than the centres of the astragals of the capitals by 0.4, 0.8 or even 1.2 ins.; and again the alignment of the low wall O (that could not change), compared with the primitivi internal alignment N of the archivolts, given by the angle of the cloister, that could not vary. But we shall have occasion to enlarge on these precautions of constructors in setting architectural members in Art. Construction.

To close what we have to say on Romanesque cloisters, we w will mention to our readers the cloister of S. Lizier (end of 12 th century). Its construction is extremely simple. It consists of two stories of porticoes, that in the ground story being of masonry, and that in the second of carpentry. Fig. 23 gives half the general plan of this cloister, and Fig. 24 is its section with the elevation of the porticos. One could not build two stories of porticos with more economy. The little columns and bases are of marble, being only 4.3 ins. in diameter (it must be stated that marble is in that province a rare material); they stand on a single continuous course, so low that it cannot be considered a wall. the capitals are very much enlarged and are of stone, like the archivolts and the masonry wall above. A floor covers this portico. Above the wall forms a sill on which are set brick piers at the angles and at the middle of two sides of the cloister; then are octagonal posts of wood with bases and capitals cut in the s solid, supporting long plates set on edge, on which are fixed the rafters, whose projection shelters the entire construction. 1
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connected by beds of mortar.

As for the shed roof of carpentry that covered the cloisters, they are very simple; they are usually composed of rafters supported by braces, forming in the interior an obtuse angle sometimes having an inclined pointed ceiling of wood.

Fig. 21 gives one of these carpentry roofs;[1] we have reproduced at A the profile of the ends of the rafters. This carpentry without ties thrust against the wall of the portico, especially when this wall was not maintained by piers sufficiently near together, and when it was raised on a long row of little coupled columns. Thus in great part the reconstruction of nearly all Romanesque cloisters must be arrtibuted to the bad combination of this carpentry, that must hasten their ruin. We should note, that sometimes, for example as at Moissac and at S. Lizier, the little columns of the porticos of Romanesque cloisters are coupled and sometimes single; when single, the capital is much wider in the sense of the thickness of t the wall than in the other direction; when coupled, the double capitals are often made of a single block of stone, as well as the two bases, so as to better connect the shafts of the little columns and render them stable. If the double capitals are independent of each other, there are then abacuses connecting the coupled columns under the imposts of the archivolts. The frequent overthrow of the porticos of Romanesque cloisters, produced by the thrust of the carpentry, evidently caused the substitution first of twin columns for single columns, and th them obliged the constructors to take special precautions in placing these little twin columns; for example such as cutting the coupled capitals in a single block of stone, and in giving them a large volume in comparison to the diameter and height of the column; as for the setting of these little columns, g generally with little or no entasis, the inside surface being vertical and the outer one being slightly inclined, or to use a building term, being slanting outside.

Note 1.p.435. This is the carpentry of the cloister of S. P Papoul, that dates from the 14 th century.

An illustration is necessary to make understood this precaution of the Romanesque constructors. Let (22) be the section of the colonnade of a cloister supporting archivolts; let A be the interior of the portico and B the court, the little

Perpignan. It presents a great quantity of little columns and capitals of marble from the 12 th century, mingled with piers and capitals of little columns from the 14 th century. Evidently rebuilt at the latter epoch, the cloister of Elne was t then vaulted; but the side arches of the vaults do not extend through the wall of the porticos as at Fontenay and Fontfroide. The architects were content with placing arches in threes with a square pier, either taken from the piers of the primitive cloister, or cut for the new arrangement; for it is necessary to state that at Elne as at Moissac, besides the twin columns, there must have existed in the 12 th century rectangular piers at certain distances to give more strength to these long porticos, as also at S. Michel de Cuxa.

Here (19) is a portion of the cloister of Elne, whose general plan is a lozenge approaching a square. At A are seen the piers that receive the imposts of the transverse and diagonal arches of the vaults constructed with much care. Fig. 20 presents the section of this cloister and an external bay.[1] In sculpture this cloister is the richest of all those still existing in our days in that part of France. The replaced capitals belonging to the 12 th century and even those of the 14 th are good work; the shafts of the little columns toward the interior of the portico are all covered by sculptures of great delicacy, and the cast constructors sought to approximate as closely as they could to the style adopted by the architects of the first cloister. One can take into account this effort of the influence of the Romanesque arts in the middle of the 14 th century in these provinces, if he examines the little columns belonging to these two epochs (12 th and 14 th centuries), that we give in Art. Colonette.

Note 1.p.484. We owe these drawings and those of S. Michel de Cuxa to the courtesy of M. Laisne, diocesan architect of Auch, who measured and drew the cloister of Elne for the Commission of Historical Monuments.

We aslo have an example of this rebuilding in the cloister of the old church of S. Papoul near Castelnaudary. This was rebuilt in the 14 th century with fragments from the beginning of the 13 th. But S. Papoul was poor; the porticos were simply covered by carpentry, and the little twin columns were rebuilt with small octagonal tiles set on each other and connec-

enclosure, present to the eyes of passers motives of decoration, that mask the labored and cold effect of these structures. Their angles viewed from several points at the end of the streets surrounding these great monuments, were especially decorated by some statue of a saint, before which was hung a lantern at night: and to obstruct passage as little as possible, as at Laon, these angles were supported on pendentives, columns or corbellings, more or less decorated by sculptures. As for the doorways of the cloisters of cathedrals, when they opened directly on the public street, they were usually of great simplicity, so as to leave to the portals all their importance and their richness.

But before going farther and leaving the Romanesque cloisters of the southern provinces, we must state that many of these cloisters were rebuilt during the 13 th and 14 th centuries. These Romanesque cloisters, as we have stated, were composed of continuous porticos formed of little columns supporting archivolts, that sustained the eave of the roof. This mode of construction was sufficient to receive visible carpentry or a wooden ceiling. A cloister of the 12 th century dependant on the church of S. Michel de Cuxa near Prades retains the primitive arrangement of porticos covered by carpentry. It is composed of rows of little columns, single and not coupled, only interrupted at certain distances by square piers, in order to maintain that long arcade in its vertical plane.

Here (17) is a portion of the plan of this cloister; in the length of each row of columns, there are only angle piers and two intermideate piers A, that maintain the arcade upright. The little columns being single and not twin, are short and stumpy; we give (18) a part of the arcade entirely built of marble from Villefranche; at B is traced the section of thes arcade with the angle pier.

But from the 13 th century vaults prevailed in the construction of cloisters, and at that epoch most of the Romanesque porticos without vaults (this was the greatest number) were taken down to be covered by cross vaults. However in the southern provinces, the little columns and capitals being most frequently of marble and of beautiful work, they were retained as much as possible, causing them to enter the new arrangement. This rebuilding is especially visible in the beautiful cloister of the abbey of Elne, situated at some leagues from

is actually only a perforated partition, that does not load the three little columns intended to carry it. The single portico of the cloister of the cathedral of Laon is very near the church, and its openings are toward the north, the cloister would then have been gloomy and dark, if the architect had not taken the precaution to cause the sunshine to enter by square windows pierced in the enclosing wall of the side next the s street at the south. This wall is thick at its base and without offsets, to avoid deposit of filth, and recedes above the springing of the vaults, then allowing to appear the little buttresses at the thrusts.

We give (15) a portion of this wall, seen from the exterior, which explains what we have just said. A beautiful carved cornice crowns it, and supports the carpentry roof covered by sl slates. To disguise the monotony of this wall, that masks one side of the church, the architect had the idea of arranging at one of its angles (that turned toward the south portal) a sort of great buttress serving as a gable for the roof of the cloister, to decorate its head on the street by a figure of an angel surmounted by a canopy, and freeing the lower part of the angle by supporting it on two columns, so as to remove its acuteness.[1] This motive is only purely ornamental and an arrangement for the square return, which is very beautiful; we show it.(16). It gives an opportunity to emphasize again the qualities, always novel and unexpected, that distinguish the architecture of that epoch, and with what art the architects knew how to derive from an ordinary necessity an ornamenta, treatment. How were that originality and fertility extinguished among us, to be replaced by conventional forms, foreseen even before execution? That is a great question, which there is not time to solve here. We are content to mention this example, that like so many others will support what we shall have to say on the couses of this decadence of the architectural genius of our country. (Arts. Gout, Style).

Note 1.p.429. In the 16 th century a sundial was attached t to the statue of the angel; perhaps another existed there before that epoch. We owe the drawings of this cloister to M. Boeswilwald, architect of the cathedral of Laon.

Almost always the external walls of the cloisters of cathedrals, walls that must preserve the appearance of a rigorous

for the openings already suggest the tracery applied a little later in the bays of the cloister. The cloister of Fontfroide never had a second story, but was covered by a terrace of stone slabs, so as to take the least possible height above the vaults, thus to permit openings above these coverings to light adjacent halls. (Art. Dallage). In fact, the side aisle of t the church adjoining the south portico of the cloister receives its light through round headed windows, whose sills are placed directly over the terrace. The eyes opened in the tympanums of the archivolts of the cloister of Fontfroide were never intended to be glazed; but it is easy to understand, t that in the climate more damp and cold, while leaving the arcade open one could glaze these eyes and thus protect the monks from rain and wind, if not to modify the external temperature, for the arcades are so low and the porticos are comparatively so deep, that assuming the eyes to be glazed, the wind could not drive rain on the pavement of thise porticos. Now there still exists along the south side of the nave of the c cathedral of Laon a cloister, which fulfils exactly these last conditions. The narrow space at the disposal of the architect did not allow him to give this cloister the square form in p plan; it is only a portico composed of seven bays facing the church and connected with it by a single bay, so that the yard gives a rectangle having a length of seven times its width.

Fig. 13 presents the plan of a portion of this cloister. It is covered by cross vaults, and dates from the first years of the 13 th century. But at Laon the vaults have no side arches; consequently these do not penetrate the construction, and do not present on the exterior a series of great archivolts from one pier to the next, as at Fontenay and at Fontfroide. These piers are abutted by projecting buttresses, and (14) the arcade is surmounted by rose windows inserted beneath the vaults. These roses were glazed and not the arcade; thus was obtained a suitable shelter and openings sufficient to light the portico. The little columns of the arcade are of a limestone schist as strong as marble, which permitted the constructors to make them small; the piers and buttresses are built in courses and carry the entire weight of the construction, for one will note iu examining the section (Fig. 14), that the wall pierced by roses above the arcade is very thin, 1.15 ft., and

indeed be entirely Romanesque, its vaults are Roman without diagonal arches, its large and small arches are round, and o one already feels there the beginning of the transition from the system of construction of the 11 th to that of the 13 th century. At Fontfroide the transition is still more advanced, although the mode adopted is the same as at Fontenay. Fontfroide is a little abbey near Narbonne;[1] its cloister is very well preserved.

Note 1.p.425. One should not be surprised, if in this Article we pass abruptly from one province to another, whatever distance separates them. General arrangements are concerned here, not details of architecture, and we have already said, that the monastic establishments acted under a uniform direction, when they belonged to the same order, whatever their location in the western territory.

We give (11) the plan of one bay of the porticos near an a angle. This cloister dates from the first years of the 12 th century, it forms a rectangle comprising five bays on two sides and four on the two others; these bays are covered by cross vaults, and these vaults are of great interest for the history of construction.(Art. construction). As at Fontenay, the porticos are composed of piers between which open three or four arches supported by twin columns of veined white marble, with capitals of the same material; the rest of the structure is of stone. The side arches of the pointed cross vaults on a square plan penetrate the arcade and form pointed arches on the exterior, while the arches of the arcade are s still round. The tracery is here frankly only a filling independent of the construction, a sort of perforated enclosure.

Here (12) is an elevation of bays near the corner and a section of the portico. A beautiful chapter hall opens on this cloister; we shall have occasion to speak of it in Article Salle Capitulaire. If the system adopted at Fontfroide is the same in principle, as that used in the cloister of Fontenay, the details of the architecture are much richer; the archivolts are moulded, as well as the eyes pierced in the tympanums of the bays; the capitals of the arcade are freely sculptured; the little columns are slender and well detached from the construction, thanks to the material employed. There is a great advance indeed toward the system adopted in the 13 th century,

traces and beautiful fragments are found. At the centre rose a column to the impost of the former cross vaults, around it being the basin of the lavatory.

Here (8) is the plan of the portion of the cloister of the abbey of Fontenay to which the lavatory was attached. The arrangement is monumental, the architecture is severe, and the construction is composed of admirable materials; at A is the refectory, rebuilt in the 13 th century, at B is the portico and at C the basin.

We present (9) one of the bays of the cloister. Each portico of this cloister consists of eight bays, giving a perfect square in plan. The great archivolts of the entrances to the lavatory are decorated by mouldings, and the piers are very rich. These piers are abutted by buttresses extended to the ground; and the archivolts of the porticos are without mouldings. These archivolts are the penetrations of the internal cross vaults, so that the construction is perfectly indicated on the exterior. The imposts of the cross vaults rest beside the wall on detached columns. The construction of this cloister is well understood and built of materials of large dimensions; the p piers between the bases and the capitals are of a single block, which gives a grand air of strength to the structure. To complete the entirety of the cloister of Fontenay, here (10) is the arrangement of an angle pier with the junction of the archivolts intersecting the square.

It would appear that the cloisters of the Cistercian establishments may have served as a type (from the point of view of the construction) for most of the cloisters erected during the 13 th century. From the instant when were adopted cross vaults to cover the porticos, there was indeed no better and wiser way than that used by the order of Citeaux. There were required resistant points of support because of the regularly spaced thrusts of this sort of vaults, and the interval between these points of support was reserved for the opening. The side arches of the cross vaults naturally appear as the external archivolts between the piers. The primitive cloisters, c compared to similar continuous arcades like the cloisters of Moissac, S. Michel de Cuxa near Prades were suited for coverings of carpentry, but could not be arranged in bays for cross vaults. Although the cloister of the abbey of Fontenay may i

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court and formerly serving as a lavatory.

We give (7) a portion of the porticos of the cloister of Th Thoronet.[1] At the two angles of intersection of these porticos on the level, the intersection of the tunnel vaults gives two cross vaults strengthened by diagonal arches.

Note 1.p.421. See Archiv. des mon. hist. at the Ministry of State, the drawing of this abbey made by M. Questel.

The capitals of the detached columns are without sculptures. Very simple claws decorate the angles of the bases, rather f for solidity than for decoration. The first course of the portice, of squared stones without mouldings, separates the pavement of the cloister from the court and serves as a bench; a another bench exists on a part of the rear wall. Whatever the rudeness of this architecture, it does not fail to have a grand character, and it is well understood as construction, for the tunnel vault cannot push piers of that depth loaded by the masonry portico of the second story. Entire absence of mouldings and profiles, only some indispensable bands cut beveled, to protect the external surfaces and to receive centering to serve for turning the arches and vaults. No appearance of closures or of glass; the upper windows themselves were often without it, especially in southern provinces.

Yet this affectation of simplicity in the construction of C Cistercian cloisters was already softened at the end of the 12 th century by the influence of the monastic establishments of Cluny, which were very far from professing the same rigor in their edifices. Thus throughout all France architecture t tended on the contrary to become richer in spite of the principles professed by S. Bernard. We find in the same province of that celebrated abbot, not far from Montbard, in the abbey of Fontenay (Art. Architecture Monastique, Fig. 9 bis) a cloister, that still retaining the general Cistercian arrangements just stated, yet already presents a certain elegance and a less primitive construction. This cloister has no second st-story and consists of a portico in the ground story, covered by Roman cross vaults, whose bays are composed of round archivolts, and are divided by double arches supported on coupled columns. Its southern portico opened on the refectory, and w was accompanied by a beautiful open hall, in the middle of w which was the lavatory. That hall is now destroyed, but the

of their abbeys a particular architectural character, peculiar to that order and which merits being studied. They renounced those light porticos most frequently covered by carpentry, and which recalled the antique impluvium, preferring vaults to woodwork in all their structures, rejecting sculpture and vain ornaments, they erected cloisters remarkable fy their appearance of strength and duration. (At the time when that order erected in a few years a considerable number of monasteries over the entire area of western Europe), these were composed of great piers separating tunnel or cross vaults, between which is placed a low and depressed opening, that rather has t the appearance of a series of openings in a thick wall, than of a portico. There no longer remains a trace of the mother a abbeys of Citeaux and Clairvaux; but we possess a very great number contemporaneous with those, and were built at the time of the enthusiasm of the Cistercians. In the South we see still standing those of the abbeys of Thoronet, Silvacane on the b bank of the Durance, and of Semanque,[1] which assume those severe forms. To explain clearly the programme given by the mother abbey of Citeaux to its daughters for the construction of cloisters, for these were built according to precise instructions given by the head of the order (Art. Architecture Monastique), an illustration is necessary.

We shall take as a type the cloister of the abbey of Thoronet. This cloister according to the general custom has four p porticos built north of the church. That along the wall of the nave is at a higher level than the other porticos, and has only a ground story, while a second story is over the others. This second story consists on a portico formerly supporting a simple carpentry roof, and gives entrance to the dormitories and various services. The porticos of the ground story present a series of great piers 1.6 ft. front by 4.9 ft. deep, connected by archivolts. A single column is set between the piers and supports small twin arches, above which in the tympanum is a round opening. A round tunnel vault, strengthened at regular distances by transverse arches borne on corbels, covers the portico beside the church. Pointed tunnel vaults c cover the three other porticos. The north portico, whose floor is lower than those of the two porticos at East and West, is accompanied at the middle by a hexagonal hall opening on the

if we examine the section, Fig. 5, we see that the section of the tunnel vault is a rampant arch, and that the corbels A s supporting the imposts of the transverse arches at the wall are placed 2.0 ft. above the heads of the pilasters next the openings; one will also note at C on the exterior a continuous gutter, indicating that originally the covering of the cloister by stone slabs was laid directly on the extrados of the t tunnel vault after the Provencal custom, carrying off the rainwater along the dotted line F C, and that probably the heads G of the buttresses were intended to receive large gargoyles. This arrangement was changed in the 13 th century, when were rebuilt two porticos of the cloister. Terraces were established on the line F K as shown on our section, and a low wall L with a bench seat and holes pierced to allow the water to fall into the old gutter, was raised 6.6 ft. above the level of t the first eave. This cloister is very rich in sculpture; the little columns, capitals, facings of the piers are of gray m marble; along the wall a rich arcade receives the tunnel vault. In the sculptures as well as in the mouldings of the cloister of S. Trophime, one feels the influence of the arts of Roman antiquity. The piers are decorated by statues and are composed with great art and have a very good appearance. We give (6) a view of a portion of the portico aud one pier, taken under the vault.

In the cloister of the abbey of Moissac, covered by a carpentry roof and not a vault, one notes on the piers, which are arranged at the angles and interrupt the arcade at certain d distences, figures in relief of great dimensions, carved on slags of marble; they represent the elevey apostles, and the abbot Durand, who dedicated the church in 1063. That abbot takes the place of one of the apostles, S. Simon. The cloister of the abbey of Moissac is composed of fragments of a monument of the 11 th century reset at the reconstruction of the cloister buildings about the beginning of the 12 th century, some years before the epoch when this religious establishment submitted to the rule of Citeaux. This explains the richness of the sculptures of the capitals and piers of this cloister, t that does not accord with the reform imposed by S. Bernard on monastic structures.

The Cistercians adopted in the construction of the cloisters

The cloisters were most frequently decorated by paintings on the walls, originally representing scenes from the Old Testament, the legends of S. Antoine and S. Benoit; later the d dance Macabre or more modern legends.

When about the 12 th century the monastic establishments had attained their climax of grandeur and wealth, the porticos of cloisters were supported by marble columns imported at great expense, and the sculpturs of the capitals executed with very particular care, traced before the eyes of the religious the scenes of sacred history or legends.

Our monasteries in the North have rarely preserved Romanesque cloisters of a certain worth; for during the 13 th and 14 th centuries, the religious of these provinces almost everywhere destroyed their old open cloisters to replace them by g glazed or nearly closed corridors. Besides, the movement for the renovation of architecture, which had commenced in the N North about the middle of the 12 th century by the rebuilding of cathedrals, followed by a great number of monasteries. The rebuilding of the churches of the abbeys requiring enormous sums, the old structures were retained; but the cloisters being very light structures and requiring expense comparatively small, were nearly all rebuilt in the new taste. With the lack of Romanesque cloisters in the North, we shall seek our examples in the South, because the monastic establishments being regulated by a common rule independent of the nature of the climate or materials, they adopted in the West forms nearly identical with their ordinary structures, for the general arrangement, if not for the details of the architecture.

One of the most beautiful cloisters of the South is certainly that of S. Trophyme of Arles. Two of the porticos of this cloister date from the beginning of the 12 th century; each of them is composed of three pincipal openings, divided into four arches borne by twin columns. Here (4) is the plan of an angle and an opening of one of the bays of the cloister of S. Trophyme, and (5) its section; it is evident from this plan, that the angle piers are very strong, as well as those separating the bays. The porticos having a continuous tunnel vault, the angle piers receive two transverse arches and a diagonal arch, that conceals the intersection of the two tunnel vaults. Each pier of a bay receives a transverse arch. But

tympanums are faced in the same manner; above is set a frieze of black lava and bricks. A carved cornice terminated the whole base of the roof before the construction of the upper gallery, which dates from the 14 th century. To make beter understood the mode of construction and decoration of this ingular monument, we present (3) the elevation of one of the arches at the scale of 1 : 40.

This structure is also rudely executed, and the capitals a are barbarous work recalling the Roman decadence. But its general appearance of the system of decoration,employed permit it to have a certain air of solidity and grandeur still impressed by Roman traditions. Romanesque constructors wished to obtain in the composition of cloisters quite wide and low porticos, so that the religious should not be incommoded by sun or wind. They yever departed from this very sensible programme, and even in the northern provinces, when they decided to glaze the porticos of cloisters entirely or in part, they continued to give them a great width in comparison to their height. The cloisters were always surrounded by buildings, and this arrangement also permitted the lighting of the adjacent halls above the roofs of the porticos.

From the 11 th century the abbeys erected cloisters of great richness, for after the church it was the most important part of these establishments, that in which the religious spent t the hours not devoted to prayers in common or to external or internal labors, the cloisters not only serving as service c corridors, but as walks and places for meditation. Sometimes in an angle of the court or on one of the walls of the portico was placed a fountain with a great basin for ablutions. A little portico or sort of covered porch sheltered the basin, and thus protected from storms the religious, who came to wash there. Still it must be stated that this arrangement is we very rare in France, though common in the cloisters of Italy, Sicily and Spain.[1] In our country the basins were often placed at the middle or in the augle of the court without shelter, or in the vicinity of the refectory. (Art. Lavoir in Dictionary du Mobilier).

Note 1.p.416. The cloister of the abbey of Thoronet still posses a basin at the wall of one of its porticos. At the abbey of Fontenay also exists a covered basin.

been a transition that escapes us for lack of monuments described or still existing. For there is a very sharp demarcation between the Roman impluvium and the Christian cloister of our provinces, which is first that the rows of columns rest directly on the ground, and that one can pass from the portico into the squar through each intercolumniation, while in the second the piers or columns are always set on a plinth, low wall or continuous support separating the portico from the square, only interrupted by rare openings serving as exits. This arrangement and the small height of the columns characterize clearly the cloister in the West, and make it . particular monument with no relation to the Roman courts surrounded by porticos.

One of the oldest examples that we have in France is the cl cloister of the cathedral of Puy-en-Velay, whose construction partly dates in the 10 th century. In the 12 th century this cloister was rebuilt on three sides. The primitive cloisters are not vaulted, but are often covered by visible carpentry arranged as a shed roof, or if a story be over the cloister, by a ceiling of beams placed across the portico. These primitive cloisters in the South of France as well as in the North, are not glazed, and consist of a series of arches resting on single or coupled columns, with points of support stronger and thicker at the angles. Still the cloister at Puy-en-Velay does not conform to these arrangements. It is covered by a series of Roman cross vaults resting on the external walls, and at the court side on great piers flanked by detached columns. This cloister is traced at the angles according to the plan. (1). The piers rest on a low and thick wall rising about 1.5 ft. above the pawement of the portico, thus forming a continuous bench in the interior as well as nekt the court; another bench B continues along the wall and serves as a base for the columns attached to the wall. The singu,ar arrangement of the angle pier C will be noted, whose plan is determined by the spacing of the columns D, that were desired to be kept equal, so as to be able to construct regular cross vaults.

Here is the elevation and section of this cloister made on the line E G.(2). The piers are built in coursés and the columns are monoliths: the archivolts with extradoses are composed of alternating plack and white voussoirs, repeated in a series of brick and stone forming a series of lozenges. The

had besieged the canon Raoul Jouvain in his house. Horsemen h had come at night into the cloister to take away the horses of the canons. Finally insults had become so common, that when one desired to threaten a canon or a cleric of the church, he said; "I will find you when you go to matins." In the month of October, 1351, five or six hundred of the most important citizens of the city of Auxerre immediately after complines, because the bailiff of Sens, ignoring these recent insults, had rendered a decision maintaining for the citizens the right of passing through the cloister of S. Etienne, whenever it s seemed good, came to march through all the alleys of the cloister, while threatening to tear down the houses of the canons, and to make their crowns red; they only retired after having filled the alleys of the cloister with filth in full daylight and with design. The affair was taken to the court of the parliament, and the chapter of S. Etienne gave up its rights for a sum of two thousand livres, that the city paid in four instalments. We have summarized the long dispute, in order to m make known to our readers the extent taken by certain cloisters of cathedrals, and also the serious disorders, caused in a populous city by the privileges thus accorded to entire quarters, thus forming a city within a city.

Note 1.p.410. Cart. de l'Egl.N. D. of Paris, published by M. Guerard, and the preface, p.109.

Note 1.p.411. Latin text. Chart. Ecc. Paris. Part II, Book 19. Feb. 1240. 28.

Note 2.p.411. Latin text. The same. Part III. Book 20. Nov. 1245. 1.

Note 3.p.411. Mem. conc. l'hist. civ. et eccles. d'Auxerre. Vol. 3.p.227.

The general arrangement of cloisters of cathedrals or monasteries being known, we shall occupy ourselves only with the structures for which this name is particularly retained, i.e., covered porticos built in the vicinity of churches.

It is to be believed that the first cloisters were only porticos in the style of the antique porticos, i.e., sheds of carpentry resting on columns with bases resting on the ground. We have vainly sought to discover at what epoch the arrangement well known as the Roman impluvium was modified, to adopt as we see accepted in the earliest cloisters. There must have

residing there, and who wished to recognize and require it. T The bishop alone had all lordship there with high, medium and low temporal justice, except in the houses of the canons, which bishop Erard had exempted from his temporal jurisdiction. The court had disputed this justice with the bishop, but had yielded. It had recognized that Bishop Erard had ceded it to the chapter for the houses of the canons, and what depended on them outside the old walls, i.e., what then formed the gardens of some, belonged legitimately to the chapter. Consequently one of these counts had accorded to the bishop and chapter the power of building walls and gates in the places where the cloister terminated toward the middle of the city, on condition of keeping them open from break of day until curfew, as done for the two old gates, this agreement had been confirmed by the king, who had permitted the enclosure as well as the bishop; but although that enclosure was well authorized, it had not been completed. The chapter had only prepared materials for it. So the citizens had always passed freely by night as by day in the streets of the cloister of S. Etienne, and they had driven their wagons there. Yet the canons always had the right to use the permission obtained. They based t this on the power of the bishop that had been granted to them, stating that a lord high justice could enclose himself, when he thought proper; that the abbot of S. Germain had recently caused to be built in his jurisdiction a tower for prisoners, that occupied part of the street, and that the inhabitants of Auxerre, who were at first opposed to it, had then consented ; that several examples of streets of the cloister of S. Etienne had been closed by the permission of the bishop, and in which had been built arcades or galleries to pass from one house to another over the street, etc." The canons based their demands for enclosure chiefly on what accidents had recently occurred during the night. A canon had been killed in going to matins; horsemen had broken through the gates; another canon had been wounded by the soldiers of the count; the provost and other lords of Auxerre had come at another time at break of day to the house of the canon collector of the king's tenth, had broken his doors, pulled down a stairway, maltreated the canon and pillaged the house. Another time the bailiff of the provost of Auxerre with his men to the number of more than eighty,

canon that received a house in the cloister was compelled to swear, that in the year preceding the day on which he received it, he had made a stay in Paris during twenty weeks, passing one hour daily in the chapter or in the church; and that he proposed to do the same in future. Also he engaged himself by oath to maintain the house and its dependances in as good state, if not better than when it came to him; finally to accurately discharge the board and other charges imposed on the house.[1]" These houses were endowed with lands and incomes, b but at the same time were burdened with numerous and very varied charges; thus the canons sought means to reduce as much as possible the amount of these charges by livings foreign to their condition. They sold wine at retail, even opened taverns, rented part of the houses assigned to them; thus the chapter statutes expressly prohipit these abuses, which proves that they existed. They also forbad each canon to allow any woman, religious or otherwise, to pass the night in the house in the cloister, with the exception of the mother, sister, relative in the third degree, or a woman of high rank, that could be refused without scandal.[2]" These statutes appeared at several times during the 13 th and 14 th centuries against the abuses resulting from the presence of women in the cloister of the c canons. The cloister of Notre Dame of Paris, like most of those of great cathedrals, then was rather a mass of houses comprised in a shut enclosure, than a cloister properly so-called. Yet we shall see soon, that the chapter houses did not exclude the porticos of cloisters in certain cathedral churches. The cloisters of cathedrals then frequently preserved the appearance of a quarter with its special enclosure, its alleys and places. Abbe Lebeuf [3] informs us, that about 1350 the cloister of the cathedral of Auxerre was only a"mass of houses adjoining church S. Etienne, most of which belonged to the chapter by donation from private individuals, by exchange or purchase. That there were only two gates of the cloister, next t the river Yonne."One is not very certain," he adds, what are the bounds of the cloister in the upper quarter. There were only some marks designating the limits, like great fleurs-delis and iron crosses. But the area, though not enclosed on that side, contained about half of ancient Auxerre. There was freedom and immunity in all that area for all the laity resi-

faithful to their programme. Still the cloisters of the abbeys of Cluny, Vezelay, Clairvaux, Fontenay, Charite-sur-Loire, S. Denis, S. Jean-des-Vignes at Soissons, S. Front of Perigueux, Poissy, S. Genevieve at Paris, Trinite at Caen, etc., and particularly of the type of the abbey of S. Gall (Art. Architecture Monastique, Fig. 1), are located at the south side of the church; while the cloisters of the cathedrals of Paris, Noyon, Rouen, Rheims, Beauvais, Seez, Boyeux, Puy-en-Velay, etc., w were placed at the north. Sometimes the cloister of the bishop's palace adjoins, and both are built at the southern side, as at Langres, Evreux and Verdun; but these are exceptions. the bishops and chapters generally preferred to occupy sites separated by the church.

The arrangements of the cloisters of abbeys were scarcely modified before the 16 th century; while on the contrary the cloisters of cathedrals suffered notable changes because of the customs of the chapters, more variable than those of the religious regulars. Men continued to designate by the name of cloister of the cathedral a mass of structures, that no longer had in general or details anything of the arrangement indicated at the beginning of this Article. Thus for example, t the cloister of Notre Dame of Paris of the time of Louis the Fat, was composed of houses of canons built within its enclosure and others outside it. That prince, before ascending the throne, caused the removal of a part of these houses located outside the cloister, but which still enjoyed the same immunities as those inside it. he made aminds for the wrong done to the chapter on the day of his marriage. At the beginning of the 14 th century the cloister of Notre Dame, which extended north and east of the cathedral to the banks of the Seine, enclosed thirty seven houses of canons."When a canon came to die,[1] if the house was in the cloister, it could be occupied by the family for fifteen days, then it was inspected by the chapter and repaired if necessary at the cost of the estate of the deceased; then it was sold at auction to another canon at the price fixed by the chapter. In case the purchaser already had a house in the cloister, he could sell it only to a canon, and dispose of the price at his pleasure; but the pr price of the house of the deceased canon must be converted i into an income for the celebration of his anniversary. Every

Note 1.p.408. (Latin poem).

Note 1.p.409. Synod. Port. Year 876.-- Synod Rom. under Eugenio II.

"Diversity of dwellings and offices in the cloister," says Willian Durand, "signifies the diversity of dwellings and rewards in the celestial kingdom; for in the kingdom of my Father are many houses, says the Lord. And in themoral sense, the cloister represents meditation in which the soul turns to itself, and where it conceals itself after being separated from the multitude of carnal thoughts, and meditates on the sole celestial good. In the cloister are four walls, which are self distrust, distrust of the world, love of the neighbor and the love of God. And each side has a row of columns. The base of all the columns is patience. In the cloister the diversity of dwellings is that of the virtues."

Note 2.p.409. Book I. Chapter 1. Sect. 43.

The most common arrangement of the cloister is this; the p portico is attached to a wall of the nave with the entrance beneath the porch and an entrance in the vicinity of one of the transepts; a portico at the west next which the buildings for strangers, or storehouses and cellars with external entrances; the portico at the east gives entrance to the sacristy, the chapter hall and ecclesiastical services; the last portico opposite that along the church, communicates with the dormitory and the refectory. The cloisters of cathedrals were surrounded by houses serving as residences of the canons, sometimes these are in common. The schools were placed against the west portico near the entrance of the church. We must add here, that usually the cloisters of abbeys are built on the couthern side of the church, while those of cathedrals are most frequently at the north.[3] The orientation on the south is much more pleasant in our climate, and it is not surprising that the r religious adopted it for their cloisters. But from a very remote epoch the palace of the bishop naturally took that as the best place, and the north side of the cathedral alone remained for building the cloister.

Note 3.p.409. It is well understood, that this is not an ab absolute rule; various causes came to modify these arrangements; nature of the ground, older structures in cities, existing streets, compelled the abbots or chapters not to be faith-

to the desires and the efforts of the people of the cities or the country, and towers in great number built in the last thirty years in our country, will furnish some centuries later a subject of study interesting to our successors; generally badly conceived, worse built, presenting heavy or ungainly outlines, they will scarcely endure, and if they are mostly ugly, we can at least console ourselves by thinking, that they will not long witness the return to one of the most vivid tastes of mediaeval peoples. After the square towers, cold and flanked by pilasters, erected on our churches from 1815 to 1840, men have sought to approach the types left by the 12 th and 13 th centuries; but the latter attempts mostly emphasize the weakness of our studies and the poverty of invention of modern artists.

CLOITRE. Cloister. Close.

A court surrounded by walls and galleries established beside cathedral, collegiate and monestic churches. From the first times of Christianity, cloisters were built in the immediate vicinity of churches. The form of plan of the cloister is generally a square.[1] Abbeys possessed two cloisters; one near the western entrance of the church; the other at the east behind the apse. The first gave access to the refectories, dormitories, chapter hall, sacristy, warmed room and the prisons; in the cloister of the religious all could walk. The second was reserved to the abbot, the dignitaries and the copyists, more retired, smaller than the first, it was built in the vicinity of the library; the infirmary and the cemetery. Cathedrals all had their cloister attached to one of the sides of the nave, either at the north or the south, it was surrounded by the houses of the canons, who lived under a common rule. Frequently schools were erected in the vicinity of the cloisters of abbeys and cathedrals. From the 9 th century the synods were occupied with the seclusion of the chapters of cathedrals.[1] "It is necessary," said these assemblies, "that the bishops establish cloisters near the cathedral churches, so that clerics live according to the canonical rule, that the priests s should confine themselves to them, not leave the church to go elsewhere to live." It was also stated that a refectory and a dormitory must be built within the enclosure of these cloisters.

below the belfry, and does not fail to be quite elegant in spite of its extreme simplicity in plan.[1]

Note 1.p.408. M. Porcel has courteously communicated to us the drawings of the tower of Thorell, that we give here.

From the 14 th century in France the towers of churches long retained the form and arrangements adopted in the 13 th century, and differed only in details, which follow the movement impressed after that epoch on the arts of architecture; i.e., that their points of support tend to become more slender, their spires and terminations more slim. The towers are covered by perforations in the stone forming surprising openings, but the mass remains the same. Now these details find their places in the Dictionary, so that we do not have to occupy ourselves with them here. Besides as we have already seen, the political disasters of the 14 th and 15 th centuries left to the monasteries, bishops and parishes no leisure to erect towers of a certain importance. Many of these towers were begun about the middle of the 13 th century, but remained unfinished, and were completed only at the end of the 15 th century and the beginning of the 16 th. When the architecture, that had originated during the 12 th century in the royal domain and the adjacent provinces, had extended over the entire surface of France, these differences of schools, so interesting to study during the Romanesque period, disappeared to give place to nearly uniform reproductions of a single type. The tower is the monument that most clearly indicates the numerous varieties of the art of architecture on the soil of the French provinces until the 12 th century. The provincial spirit was extinguished under the royal power, and that diversity vanished. If the nation gained from the point of view of politics, the art lost its originality, and the reproductions of types held in honor in the royal domain were often incomplete or badly understood in the distant provinces. Yet the towers were long the monuments loved by the cities; after each disaster, the people hastende to rebuild them or to repair them as best they could. Men speak in our time of the influence of the tower to designate the local spirit, the exclusive defense of the interests of the city, and we see daily poor villages impose heavy burdens on themselves, to erect a tower for their church.

The state of the architectural arts today does not correspond

We give (86) the plan of the lower story,(87) the plan of the lantern, and (88) the elevation of this tower, whose single bell was suspended at the centre of the circular lantern.[1] This bell whose bottom must have been at the level B, could not be rung; it was very probably fixed to an internal cross beam placed on the cornice at the level A, and the ringer being placed under the arch at C was satisfied to strike the hammer against the edge of the bell, or in other words, to ring by means of a rope attached to the lower end of the clapper, as still practised in all southern Italy. The upper part of t this tower of Molleges no longer exists above the level A.

Note 1.p.404. M. Revoil had the courtesy to give us the accurate drawing of this tower.

We do not believe it necessary to enlarge on the various applications of Roman art to the towers of Provencal churches, for that would be to digress from our subject, these examples having none of the characteristics of French architecture, p properly so-called, and only being mentioned as having exerted a certain influence on the structures built along the Rhone, outside that province and even in Lyonnais.

Before closing, we must mention the existence of towers built on a very pronounced rectangular plan, which serves as a transition from the bell cot with simple arches like those g given in Figs. 80, 81, 82, and the bell tower. These towers on a rectangular plan are rare. There exists a very large and very old one on the facade of the old cathedral of Carcassonne originally serving for the defense of the city. We possess another of a more recent epoch (beginning of the 13 th century), built on the strengthened wall of the single lateral chapel of the little church of Thoureil. Erected in the vicinity of the sacristy and the sanctuary, this tower was within reach of t the celebrant. See how it is placed in the ground story(89). A is the plan of the lateral chapel built on the bank of the Loire; a tunnel vault turned over the recess rests on the pier C and on the mass E abutted by a thick buttress extending down into the river. Above the roof of the church, the belfry of t tower of Thoureil presents the plan (90). The elongated form of this plan clearly shows that the bells could be swung lengthwise. In perspective (91) this tower, whose termination no longer exists above the level F, is enriched by a blind arcade

of towers are of carpentry, although assuming the form indicated here. The effect of these terminations of towers is not happy, for it seems that the angles meeting the apexes of the gables do not have a sufficient bearing, that they push outward, and we cannot blame our architects of the middle ages f for not having adopted this system of construction. That is further not the sole defect with whilh we cam reproach the towers on the banks of the Rhine in the Romanesque epoch. It is seen (Fig. 85) that in the two last stories of the tower, these are identical; it frequently happens that some even possess six similar stories thus superposed; that gives to these edifices a monotonous appearance that fatigues; one does not know which of these stories contains the bells, or if they do not all have them. The towers of the Rhine have neither beginning nor end, and one cannot understand why the structure comprises so many stories, or why it stops at the fifth or sixth rather than at the second. The terminations do not connect in any manner with the square stories. There is here an entire lack of taste and feeling for proportions, far removed from o our French conceptions of the same epoch, all whose parts are connected with art, and from which it seems that one could n neither omit anything or add anything to them.

Since we have just made an excursion outside France, we will also speak of the towers of Provence, that are no more French than the towers of the Rhine. Ef the arts of Lombardy and of the shores of the Adriatic had a powerful influence on the b banks of the Rhine, the Roman monuments that cover the soil of Provence still reigned as masters in that province in the 12 th century. The Romans of antiquity did not built bell towers, but they did erect certain votive or funerary monuments, for example like that of S. Remy, which rigorously might furnish types of towers to the architects of the middle ages. They in the lack of other traditions or influences, did not fail to take for models those remains of Roman architecture. We find placed on the gable of the facade of the church of Molleges a little tower of the 12 th century, that reproduces quite accurately, though in a barbarous manner, the antique monument of S. Remy. The tower of Molleges is not over 6.8 ft. outside at the base; it consists of a square story borne on four piers connected by four archivolts, and a lantern on a circular plan.

before the arches.

As for bell towers crowned by gables and roofs with two eaves, these are found in great number attached to little churches and dating from the 13 th, 14 th and 15 th centuries in Beauvoisois and Brie. Sometimes even instead of two gables, the towers have four or two intersecting roofs, thus forming four valleys, and crowned by a spire. The little church of Chapelle-sous-Crecy has preserved a tower of that kind, which is one of the most complete that we know, it dates from the second half of the 13 th century. We present its elevation.((83). At the ends of the four valleys four stone gargoyles throw the water from the four roofs far from the surfaces. The little wooden spire covered with slate is octagonal in plan; its angles are set on the ridges and valleys of the roof, which is perfectly intelligible.(Art. Fleche).[1]

Note 1.p.402. This drawing was given to us by M. Millet.

Towers with four gables are very common on the banks of the Rhine and dating from the 12 th century; but their terminations present a peculiarity only belonging to these provinces and that are scarcely imitated in France except in their vicinity. These terminations consist in a pyramid with eight sides, four of whose angles rest on the angles of the tower, a and the other four on the apexes of the four gables; so that the inclination of the sides of the pyramid necessarily give the height of the gables; the more acute the pyramid, the higher are the gables. Indeed (84) let A B C D be the plan of the square tower on which is placed the pyramid with octagonal plan. In erecting a gable of the side A C of the square, (since it supports the angle E O), this gable must intersect that angle at the point G. Now in Fig. 846 bis, E O being the angle, E P the axis of the pyramid, the gable A C G of the p plan represented in section and erected on the point G will meet the angle at L; but if this angle has a greater inclination, for example according to the line E'O, the gable shown in section and erected on the point G will meet the second a angle at M. Thus these gables are higher as the spire is core acute.

A view (85) of one of the towers of the cathedral of Spires will make our demonstration intelligible. At Spires the crowning spires are of sandstone; but frequently these coverings

two arches reserved for placing the bells. The top of this w wall is covered by courses of stone set sloping. The bells w were rung from the interior by means of iron cranks attached to the axles as indicated at D, and cords passing through the roof. It is difficult to suspend bells at less cost. But these towers were only a structure fulfilling a need without any d decoration, were frequently found erected in the vicinity of a sacristy on an eave wall of the church or on a buttress. In small village churches whose government was in the hands of a single priest, he did not have to give orders to numerous assistants, and was obliged to ring the bell himself before ascending to the altar; it was then natural to place the bell near the sacristy.

The little church of Froissy has preserved one of these bell cots built in the 13 th century on a buttress in the vicinity of the tower; we give a view of it (81). In the southern provinces are found a good number of bell cots of this kind, that have a certain importance, but whose construction scarcely d dates beyond the 13 th century. It must be stated that this sort of structures, exposed to wind and rain, cannot resist as long the storms as the covered towers, and the Romanesque towers with simple arches erected in those provinces, where the materials are soft and affected by atmospheric changes, must have been frequently rebuilt. Indeed the church of Lalande of Libourne, of which we give an elevation (82), presents on its facade dating from the 12 th century a tower with arches, whose jambs are still Romanesque, and whose archivolts w were rebuilt in the 13 th or 14 th centuries.

There exist towers of a more recent epoch in Guyenne and L Languedoc, where brick structures are so frequent, which possess five, six or even ten arches suited to receive bells; these are most frequenlty simple gables pierced by openings placed as three times three, three and two, three, two and one, or four, three, two and one. This sort of bell cots generally do not have the architectural character, that distinguishes them from the most ordinary buildings, yet one finds near Toulouse some very elegant bell cots built on this principle; we will cite among others that of Ville-Nouvelle, whose two stories of triple arches are flanked by two turrets containing stairs with a passage from one turret to the other b

that give us one of those terminations that we vainly seek on the monuments themselves. And this does not here concern those gables of such simplicity, that one cannot assign them a date, but indeed a rich composition, that besides must illustrate to our eyes some important points relating to the termination of certain towers of Ile-de-France during the Romanesque period.

Here (79) is a copy of that little model of a tower. Our R Romanesque monuments generally stop at the level marked A on our engraving. One sees here above that level A a truncated pyramid formed of four courses of stone covered by chevrons, then a portico composed of detached columns, connected by small arches and supporting a cornice with modillions on which rises a gable decorated by two arches and terminated by a cross. The place of the bells is well marked by a very open arrangement of the portico and the upper gable. The last stories of this tower recede, as we have assumed in the restoration of the great tower of S. Benoit-sur-Loire, and the relatively wide base is marked by a strong projection beyond the r rest of the construction. The system of the portico adopted for the upper story intended for the belfry has always seemed to us to have been the primitive termination of the Romanesque towers north of the Loire. The model reproduced in Fig. 79, a number of reliefs and certain vignettes of manuscripts,only strengthen our opinion. Loggias built at the tops of church towers must necessitate the construction of roofs with two e eaves and gables, or at least of carpentry hip roofs. It should also not be forgotten, what we said at the beginning of this Article regarding the dimensions of old bells and the little space required for their suspension. We have said that walls pierced by arches and erected on the facades of churches must suffice for placing bells of very small diameters. We find indeed at a very ancient epoch towers in great number, so arranged in the South of France, and even in the provinces of the North. The little church of Rue S. Pierre, whose facade dates from the beginning od the 11 th century, has a tower of that kind.

To make the arrangement of this tower better understood, we give (80) the entire facade at A and its side elevation at B. Two buttresses C C rise from the ground and form the jambs of the doorway in the ground story, and abut the wall pierced by

to the top of the tower, one ascends by ladders. The tower of the Jacobins of Toulouse was never crowned by a spire; yet we find analogous towers at Toulouse, Caussade and Montauban, t that are terminated by acute octagonal pyramids of brick; but this last arrangement is of a more recent epoch.

The towers of the upper Garonne are in France an exaggeration, that belongs only to that province; an exception justified by the scarcity of building stone, and all have such analogy, that the example here given, the most beautiful and most complete, will dispense with further enlarging on this mode of construction.

It is necessary for us again to return to find the origin of a certain arrangement of towers, an arrangement that only rests on a few examples preceding the 14 th century, but which must still be very old. We speak of the towers terminated by two gables and a roof with two eaves. In Ile-de-France on the banks of the Oise and Maine we meet with a certain number of these towers always belonging to little churches. This was i indeed a economical means of crowning, the towers, and we already have shown that before the 12 th century these provinces, less rich than those of the West and of the Centre, had given to their towers only limited dimensions. On the banks of the Seine, lower Marne, Oise and Aisne, there exists a prodigious number of parish churches of the 11 th and 12 th centuries, that have retained their towers; modest structures only composed of a substructure without openings and a belfry story; but almost all these towers have lost their primitive terminations, that were replaced by spires of stone or wood during the 13 th, 14 th and 15 th centuries. A good number of these towers must have been originally terminated by low stone pyramids; but still a greater number were covered by gables and a roof, that mode of construction being less expensive of all that could be adopted. In default of monuments of some impohtance existing today, and which could be studied this kind of termination, it is necessary for us to have recourse to representations of these monuments on the reliefs. Now there exists on the portal of S. Anne of the cathedral of Paris a great tympanum of the 12 th century, representing the Virgin seated beneath a magnificent canopy. This canopy is composed of a s sort of dome flanked by two towers, executed with minute care,

single structure divided into two aisles by a row of tall columns set on the axis of the building. Radiating chapels are around the single apse. (Art. Architecture monastique, Fig. 24 bis). At the north side of the church and before the radiating chapels rises a great tower on a heavy base, communicating with the nave only by an arch.

This tower, of which we give a perspective view (76), is b built on an octagonal plan from bottom to top; its entire construction is of bricks, except the belts, gargoyles, capitals and pinnacles, which are of stone, and the little columns of the upper arcade, that are of marble. The ground story alone is vaulted. From the top of the vault, about 81.2 ft. above the pavement of the church, the construction is simple with neither vaults nor floors. Each story recedes about 3 ins. toward the interior.

We give (77) the quarter of the plan of the upper story. We Were it not for this receding that diminishes the diameter of the tower at each story, these are all similar in height and arrangement; the second story alone is comprised between the vault and the cornice of the building, and is higher than the others, presenting on each side of the octagon twin blind arches. The four other stories are similar to each other, have open windows covered by archivolts, but by corbellings forming right angles at top.

The detail of the upper story of the tower will explain this singular construction, perfectly restored by the nature of the materials employed. It is evident that the architect has used a single pattern of brick, and has not desired to mould the voussoirs, which he would have been compelled to arrange, if he had covered the arches bn small round arches. Yet the engaged columns of the piers are cylindrical and have been moulded expressly; but it is much easier to give a particular form to the bricks before burning on its bed than on its face. The bricks of the arches of the upper balustrade alone are moulded as voussoirs. It is also clear that stone being v very rare has been but exceptionally used in this structure, and for the execution of the architectural members, that cannot be made of another material. The courses of stone are indicated in Fig. 78. A winding stairway attached to the tower leads to the height of the cornice of the church; from thence

Gothic principle. A masterpiece of science and calculation, t the tower of Strasburg only produces a sufficiently ungraceful outline, and in spite of the efforts of the architect, with the boldest and most ingenious combinations; and were it not for its enormous height, which in great part makes its reputation, one would justly regard it rather as a skilful aberration than as a work of art. We shall have occasion to speak of the most important story of that tower, the spire, in Art. Construction.

We do not believe it necessary to enlarge further on towers erected during the 14 th and 15 th centuries; as a principle of construction and of general arrangement, they conform to t the beautiful examples left by the architects of the end of the 13 th century, and differ only by details of the mouldings and of sculpture, by the excess of lightness. Besides in France the 14 th and 15 th centuries rarely had the leisure to erect expensive structures. The 12 th century left but few t things to do in the matter of religious monuments, and the two succeeding centuries only had to complete unfinished constructions. We do not possess a single great tower built at o one spurt during that epoch, while Germany and England, sheltered from the disastrous wars, that ruined our country, erected very important church towers. One of the most beautiful is the tower of the cathedral of Freiburg, built over the porch of that church. The spire is very acute and entirely open. Gothic architects must necessarily come to that; they did not fail in it.

Before passing to campaniles and little towers of parish c churches, we must mention certain great towers erected on the banks of the upper Garonne. Those provinces from Muret to Agen not possessing limestones, bricks were almost exclusively employed during the 12 th, 13 th 14 th and 15 th centuries by the architects. Toulouse still possesses a certain number of towers built of brick, in whose construction in that kind of material is employed with perfect judgment. The principle of Gothic architecture, subject to the nature of the materials used,must necessarily compel the masters to give to brick architecture forms different from those of stone; this occurred at Toulouse. The church of the Jacobins of that city was built about the end of the 13 th century, and is composed of a sin-

nothing to be desired; details being drawn with a delicacy t that recalls the best engravings of Callot, the constructicy indicated with scrupulous care. That engraving is 15.4 ins. high and 11.8 ins. wide, exclusive of the title and the arms engraved above and below it. A number of finely treated figures fill the place before the portal. There exists a copy of that engraving which is very inderior to it.

The plan (75 bis) shows at A the horizontal section of the tower at the level of the lower story, and at B at the level of the upper story of the pinnacles. The octagon of the tower, formed of four large sides and of four smaller ones externally, circumscribes the square cabe of the belfry, and as at the c cathedral, the pinnacles cover the angles of the carpentry. Also as at the cathedral, these pinnacles are portions of octagons in plan, but abutted in the lower story by columns C, which circumscribe these partial octagons in rectangles. At G are seen the successive offsets of the buttresses projected on the horizontal plane, and at H is one of the galleries connecting the two towers. All that is very skilfully combined, is very stable and easily understood, which is a fine quality. (Art. Construction). The piers D are left solid between the openings of the belfry and the pinnacles, and lead the eye f from the buttresses of the base to the solid surfaces of the spire by a happy transition; they have also the advantage of permittinm louvres to be placed in the large openings, and this without effort or pedantry. The architects of the middle ages should have stopped there; this was the last limit that the art of architecture could reach without falling into exaggeration and labored treatment, and this limit was soon passed. The passion for apparent lightness in construction, the desire for erecting surprising edifices, soon led architects into a false path, which in spite of the science displayed, caused them to exceed the limits of good sense. It was chiefly in t the provinces of the East near Germany that the abuses made themselves felt; for a long time still in the royal domain, architects retained a certain moderation in applying the principles established at the end of the 13 th century. The tower of the cathedral of Strasburg, founded in 1277 and completed after designs made during the 14 th century by John of Steinbach, is the most extraordinary summary of the abuse of the

although his two towers, according to the mode adopted about the middle of the 13 th century, form a part of the facade a and rest on the first bay of the side aisles, they plainly m marke their places from the base of the edifice.

We give (75) one of these two towers, similar to each other.[1] Above the side aisle was an open vaulted story allowing light to pass through the window of the first bay of the nave. From the place located before the portal were perceived the flying buttresses of the nave through the windows A of that hall in the second story. The vault of the hall of the second story was raised exactly to the height of the vault of the principal nave, thus allowing the lighting of the first bay of the nave. Nothing is more simple and better expressed than such an arrangement, which shows perfectly the construction of the church, and that allows to the tower its character of an annex. Buttresses without useless ornaments rise to the cornice B, w which extends at a level with that of the nave. On these buttresses are borne the pinnacles, that accompany four sides of the octagon of the belfry. These pinnacles are in two stories, one being square and set diagonally like those of the tower of Laon given above in Fig. 73, the other with eight sides. A g great spire surmounts the octagonal story, and four small pyramids crown the pinnacles. Two open galleries C, one passing directly behind the great gable of the nave, and the other behind it, connect the two towers at the middle of the story of the belfry. The towers of S. Nicaise appear to us to be the most complete expression of the Gothic tower adjoining a facade; lightness and solidity, simple in arrangement, programme exactly fulfilled, construction well understood, nothing is wanting to this work of Libergier, it lacks only to be still standing to allow us to study it in its details. The engraving of the facade of S. Nicaise is sufficiently perfect to permit us to restore the plan of the story of the belfry, and this plan is no less skilfully conceived, than that of the towers of Notre Dame of Rheims. It even presents in its arrangements the quality of simplicity lacking in the towers of the cathedral.

Note 1.p.390. Our drawing is made from a charming engraving now very rare, dated 1625 and signed by N. De Son of Rheims. contrary to the customs of engravers of that epoch, the character of the edofice is reproduced with a perfection leaving

structures attached to the four angles of the tower; they are intimately joined to it, forming vaulted coverings over the corners E of the bell cage of carpentry, which enter the octagon of the tower. These pinnacles are not divided in stories like the mullioned windows serving as openings of the belfry. One of them at C contains an open stairs, that permits reaching the top of the vault. This plan is very well studied, as well as all arrangements in general at that epoch, as that in the interior it gives a square cage to the belfry, necessary for the swing of the bells and the stability of the carpentry, and on the exterior it forms an octagonal tower flanked by f four pinnacles serving as transition between the square base and the octagonal pyramid. This is the complete solution of the problem set by the architects od the end of the 12 th c century, and which was but imperfectly solved at Laon. As for construction, the towers of the facade of the cathedral of R Rheims were treated by a wise and skilful master; inspection of the plan alone causes recognition of that essential quality; thus in spite of deterioration caused by storms, these t towers have a perfect solidity.

Note 1.p.388. See Art. Facade for the towers of the cathedrals of Paris and of Rheims.

About the same epoch at the end of the 13 th century, Libergier, a native architect of rare merit, erected in the city of Rheims a church, whose demolition is to be always regretted; the church of the abbey of S. Nicaise. At the cathedral the two towers of the facade rise above it without being visibly connected with it. The buttresses that abut the towers are so enclosed by ornaments and by galleries connected with the portals, that an effort of the mind is necessary to understand how these towers rest on that mass of little columns, pinnacles, openings and sculptures. In our eyes that is a capital defect, and the richness or beauty of the details does not compensate for the confusion of the principal lines, the lack of visible points of support. One would take from the facade of the cathedral of Rheims its two towers, i.e., its two stories of belfries, when in viewing the remaining structure, one would not perceive that to them was lacking a necessary and foreseen complement. The architect of the church of S. Nicaise knew how to avoid that serious fault in composition, and alth-

so that we can see in the presence of these colossal animals at the tops of the towers only the connection of events connected with the erection of the monument. There are in the homage rendered to the patience and strength of useful animals, that contributed to the building of the church the naive expression of a very touching feeling of justice. From the point of view of art, the presence of these colossal sculptures gives to the summits of the towers of Laon a singular appearance, that neither lacks originality nor grandeur. It is unnecessary to emphasize the beauty of this composition. The manner in which the pinnacles set diagonally are borne on the angle buttresses, the rich corbellings established at the level A, which serve for transition between the form of these buttresses and that of the open pinnacles, the moderation of the details, the happy proportions of the stories of the tower, and those repetitions of horizontal lines a certain heights, make of this entirety a magnificent monument. Unfortunately these structures were built in haste, erected with materials of moderate quality and with too little care, and do not correspond to the masterly grandeur of the composition. It is n necessary in our time to come to important restorations, necessitated by the ruinous state of the facade of the cathedral of Laon. These restorations, directed with intelligence and skill by one of our most skilful colleagues, will permit the towers of Laon to endure for several centuries.

Note 3.p.386. Art. Animaux, Fig. 3.

Henceforth in the churches of the 13 th century the plan a adopted at Laon for the towers was to prevail over the plan of the architects of Ile-de-France. About 1260 was begun the erection of the two towers of the facade of the cathedral of Rheims, which are only of moderate importance, compared with the height of the facade. Their belfry stairs alone are detached from the lower construction.[1] But the plan of these towers at the base of the belfries is remarkable. We give here (/4) at A the level of the base of the belfry, and at B that below the octagonal cross vault, that covers the tower below the spire. These stories were projected in stone but not finished; the disasters of the 14 th century arrested their execution. If this plan be compared to those previously given in the course of this Article, a sensible advance will be found. The angle pinnacles are then no longer a digression, little

carry the spires. One cannot too much admire the grandeur and simplicity of this beautiful construction, so well arranged to receive the bells and to allow their sound to pass outside. The wooden bell cage resting on a recess placed at the level of the great open gallery, bearing on thick masonry with discharging arches, can cause no vibration in the piers of the towers, that form the enclosure perfectly independent around this bell cage.[1] This arrangement of the square plan of the towers up to the base of the crowning pyramid, at the beginning of the 13 th century belongs exclusively to Ile-de-France. On the banks of the Oise had already been adopted the octagonal plan for the upper parts of belfries from the beginning of the 13 th century,[2] with great open pinnacles on the angles of the square bases. The cathedral of Laon, contemporary with that of Paris, and whose style of architecture has the greatest affinity to that of Notre Dame, possesses four towers terminated by octagonal belfries, on the faces parallel to the diagonals of the square being flanked by pinnacles with two open stories.

Note 1.p.388. See Art. Beffroi, Figs. 8 and 9, that give se sections of the bell cage of the southern tower and of the m masonry enclosing it.

Note 2.p.388. Even before that epoch as shown by the tower of Tracy-le-Val. Fig. 49.

Here (73) is the elevation of one of the towers of the facade of the cathedral of Laon taken above the vault of the nave. Stone spires no longer exist, part of which is indicated in our fig., surmounted these towers. On the second story of the open pinnacles are placed animals of colossal dimensions representing oxen; it is believed that the chapter of Notre Dame of Laon caused these figures to be sculptured and set in remembrance of the labor of the animals, who had laboriously hauled the materials of the cathedral to the summit of the hill crowned by it.[3] The legend (for there is always some legend attached to the construction of the great edofoces of the middle ages) claims that several oxen attached themselves to materials of considerable weight left below the precipice, and courageously hauled them to the workyard. We do not guarantee the fact; but the idea of the chapter and the master of works of the cathedral of Laon is too much in the spirit of the epoch,

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singularly to the effect produced here.

The detail of one of the angles of the tower (71) will illustrate the mode of construction adopted, as well as the happy composition of these angles open in some parts, as if to establish a transition between the solids of the piers and the void of the atmosphere. Indeed that was one of the preoccupations of the architects of the 13 th century; they feared solid and rigid outlines, it seems that the desired in structures detached against the sky, to avoid the abrupt transition from the solid to the void. This principle, which indicates a very refined feeling for the external form of architecture, that lightened the enlarged edefices by making them bland into the sky, so to speak, carried to excess gradually led the architects to execute the stone lacework of the 15 th century.

We give (72) the quarter of the plan of the upper story of S. Pere on which must arise the stone spire. This plan indicates at A the arrangement of the pinnacles at the four angles, that of the four openings, and how the octagon is inscribed in the square.

Dating from that epoch (middle of the 13 th century), but rarely are found detached towers. In France proper the towers belong to the facades of churches; they participate in their general composition and altually become towers only above the level of the side aisles and the walls of the nave; yet until about the end of the 13 th century, architects took care to place the gables of the carpentry of the high towers behind the depth of the towers, so as to allow them to be more freely detached above the great vaults. Thus are arranged the two towers of the facade of the cathedral of Paris; an open gallery conects them at the height of the base of the belfry. Same arrangement at the cathedral of Laon. The towers of the f facade of the cathedral of Paris, known by the name of towers of Notre Dame, were built only to the bases of the stone spires, that were to crown them, their construction may perhaps be comprised between the years 1225 and 1235, from the base of the great open gallery to the top. These towers remain square up to the base of the spire, their angles are strengthened by buttresses, and twin openings occupy on each side the entire height to the great gallery and the upper cornice. Internal corbellings passing from the square to the octagon must

openings for the passage of the bells. On the square base above the band B, the upper octagon is already suggested by means of little columns, that already project from the wall and enclose the middle openings. The spacesbetween these shafts and the four angles are solid (for the stairway C only ascends above the vault of the second story), and they form the four principal points of support, the angle piers of the tower. T The last story with octagonal base has its faces parallel to the diagonals of the square on trumpets. The angles of the square tower are terminated by open pinnacles. Below the octagonal story at D are noted carved medallions inserted in the sort of false balustrade, that recalls again the rosettes of reliefs, that we have seen between the bands of the tower of the church of Charite-sur-Loire. It seems that these medallions of the number of twelve represent the signs of the zodiac; we think at least that this was the idea of the architect; b but the sculptor appears to have left himself to fanciful conceptions in the execution of some of these little reliefs. O One of these madallions is merely a fossit ammonite, such as frequently found in the old limestone in the vicinity of Morvan. This was a natural sculpture just found and placed there. Four statues of angels sounding the little ivory horn and crowned by canopies, happily terminate the angles of the second story of the belfry; on the sides of the octagonal story eight smaller seated statues accompany the pinnacles. If the general composition of the tower of S. Pere is remarkable, easily understood, the details, such as the mouldings and sculptures, are executed with that boldness and freedom, which belongs to the Burgundian style of the 13 th century. The angles with t their little columns detached from the mass and connected to the piers by rings and the abacuses of the capitals, break t the dryness of these angles and lead the eye to the open outlines of the pinnacles. But one of the charcaters peculiar to this mode of architecture is, that the mass of the structure is independent of the decoration. The piers and the solid parts are built in low courses, that may pass for rubble dressed with the pick, while the bands, archivolts and little columns are constructed of large blocks of stone set on edge, of good quality and cut with care. The contrast between the construction of the mass and the part purely decorative adds sin-

about 1240, the architect as a dependant of the abbot of Vezelay wished to protest against the Cistercian tendencies of Burgundy at that epoch; for he had erected at the sides of t the portal of the church of S. Pere two enormous towers, if compared to the size of the church. Of these two towers only one was completed, except the spire, which was made of wood in the 14 th century and covered with shingles. To see that elegant structure, beautiful by its happy proportions and by the charming details that cover it, one must believe that the Burgundian school, in spite of the Cistercians, was not then at its first experiment; it is not by the first attempt that one attains to similar conceptions. There must exist in those provinces other towers forming the transition between the Romanesque towers of Burgundy and of Nivernais and the tower of S. Pere. That transition for lack of existing examples and in spite of our researches, entirely escapes us, and if one finds still in the tower of S. Pere some traces of he Romanesque traditions of those provinces, it must be confessed that they are scarcely appreciated.

Note 1.p.382. See Art. Architecture Monostique.

Fig. 70 presents a perspective view of that tower as the p primitive architect left it, i.e., without the spire and before the construction of the porch, that masks its base. At E is visible the charm of the structure of the nave of the church contemporaneous with the tower. Scarcely had it been erected, than was added to it a gable covered by statues and sculptures, whose considerable height included a portion of the a angle of the tower up to the level F. Our view gives the tower of S. Pere here as it was before these successive additions. Although it was erected on the first bay of the north side ai - aisle of the church, and that one of its angles rests on an isolated pier, yet its base did not give entrance to the side aisle; it retained at least on the exterior the appearance of a tower starting from the ground like the Romanesque towers. In the interior it consists of a vaulted hall over the side aisle, lighted by twin windows. Over that hall the tower is entirely empty. The top of the vault of the second story is paved lat with gutters along the four walls ending in a gargoyle for discharge of the water driven into the belfry by wind. This vault and that of the side aisle are pierced by

sense and never sacrifices the true and substantial for the appearance of ostentation. These qualities and even these defects appear in the most evident manner in the monuments erected during the 13 th century in Burgundy; for the new architecture originated at the beginning of that century has the advantage, when sincerely and skilfully employed, of bringing to light all the qualities and defects of those applying it. That is why we regard this architecture as truly belonging to our country.

The traditions, the tendencies of the clergy toward a hieratic art, and the formulas can do nothing; this art advances alone, and it paints in its various charms the character of the peoples even of the individuals. Now towers by the motives deduced above, at least monuments of inspiration as much as of utility, emphasize more vigorously than any other edifice the qualities proper to each province at the time art can pass from its Romanesque restraints.

Unfortunately for art, Burgundy possesses only a very small number of towers of the 13 th century. The churches of the o order of Citeaux were influential and very numerous in that province, and it is known that this order allowed for placing the bells in its sacred edifices only the arrangements rigorously necessary. S. Bernard had excluded from the churches of his order not only sculpture but towers, as being monuments of vanity without real utility.[1] The judgment of S. Bernard a again confirms our opinion of the importance given to towers during the middle ages, viz:- that they were rather structures for show, the pride of cities or monasteries rather than towers intended to receive bells. If religious feeling caused t the building of churches, the feeling of wealth or of power erected towers, and the anathema pronounced by S. Bernard against towers will suffice in the lack of other proofs, to justify our estimation. We can always complain of the rigor of S. Bernard, who deprived us of beautiful and original conceptions like all those, which in the 13 th century sprung from the school of Burgundian architects. Vezelay belonged to the order of Cluny, strongly opposed to the rigor of the order of Citeaux, as all know; now near Vezelay is a little church dependant on that monastery; this is the church of S. Pere or rather of S. Pierre. It seems that in that little edifice erected

of that epoch have been crowned by more recent constructions. We have seen that in the West one of the two schools of those provinces built in the 11 th century spires of rubble form ng quite a large angle at top, and that the other school erected conical or pyramidal spires in courses of stones with scales and quite acute. In the Carlovingian provinces of the East, spires that date from the same epoch, square or polygonal, are likewise built of stone and are tolerably acute; in the 12 th century Burgundy already places on its church towess very acute spires, for example the tower of S. Jean of Auxerre. In Normandy towers of small dimensions appear to have been crowned in the 11 th century only by stone spires, rarely forming a right angle at the apex, like that of the pretty tower of Than near Caen; the great towers are evidently constructed (particularly those erected over the crossings of churches) to receive wooden pyramids. It was only in the 13 th century, that this province covered its church towers with very acute stone spires. In Ile-de-France the method adopted in Normandy seems to have been followed; the oldest towers only possess v very stumpy stone spires, and during the 12 th century appeared the acute pyramids. The only conclusion that one can draw from these various data is, that about 1150 in the Centre, in Burgundy, Normandy and the provinces of the royal domain, the acuteness of the spires was regarded as a necessary complement of every tower, large or small.

But let us return to Burgundy. From the beginning of the 13 th century was formed in that province a Gothic school, that was on equal footing with those of Ile-de-France and Champagne; if the general principles i had adopted belonged entirely to the new revolution in architecture, still it possessed its own distinct character, the result of Romanesque traditions, of the quality of the materials, and it must be stated, of t the mental nature of the inhabitants of that province. The B Burgundian was and still is bold without rashness, he goes s straight to the aim, avoids difficulties that might arrest h his progress rather than discuss their value or extent; less refined than the inhabitant of Champagne or of the banks of the Seine, he sins rather by excess of strength, that disposition in him often goes to brutality, he is driven by nature to appear powerful, resolute and daring; but he possesses good

rest on little columns. The stone spire of this tower has not existed for a long time. The base of the tower of Vermanton is not without openings, like that of S. Jean, but it forms a vestibule before the side aisle.

In the same city at Auxerre yet exists another tower, built some years after that of S. Jean (about 1160), but which more frankly belongs to the Burgundian school. That is the little tower of S. Eusebe. We give (69) the elevation and at A the section. This tower was originally placed near the choir on the North side and rose from the ground; its plan is an exact square. Today it is engaged in the side aisle of the choir of the 16 th century, at the end of the nave of the 12 th century. Above the ground story and pierced by a single small window, rises the pretty blind arcade formed of pilasters and little polygonal columns, with foiled pointed arches. That arcade serves as a substructure for the belfry, very happily opened. In the interior from the level of the vault of the ground story of the base of the spire, the surfaces rise vertically without recessions or projections' at B alone are seen corbels on which probably rested the upper wooden floor. Four trumpets support the last octagonal story, that receives a stone spire rebuilt in the 15 th century. One will note here that the upper story has an irregular octagonal plan with four large and four small ones on trumpets. One also finds at the t top of the tower the cornice composed of little arcades, that we saw at Charite-sur-Loire, on the tower of S. Jean of Auxerre and on Rhenish towers.

The tower of S. Susebe is admirably constructed, and its p points of support, arrangement of stories, details, mouldings and sculptures indicate the hand of a skilful architect and man of taste. It is to be regretted, that the spire of this tower was destroyed, for it would be interesting to know how the author of this tower had placed the irregular pyramid on the irregular octagon; was it also irregular, or did the architect compensate for the differences of the sides by some special arrangement? The last system seems to us to present more probability.

We must confess to our readers, that there prevails great uncertainty concerning the form and dimensions given to spires of towers during the 12 th century, for most of the towers

is unbroken up to the story of the belfry, and is only decorated by a blind arcade at the level A. Eight buttresses flank the four angles up to the springing of the internal pendentives, that spport the octagonal story B. On each side three o openings in the belfry story allow the sound of the bells to pass outside, and at each angle of the square are placed solid pinnacles, that strengthen the four angles of the tower by their weight. A pyramid with eight sides rises over the last story and is decorated at its base by four solid gables. The sides of the stone pyramid are slightly convex, as if to better lead the eye from the vertical octagonal story to the upper point. From the base to the apex of the spire of this tower is 160.8 ft. The construction of the tower of S. Jean of Auxerre is executed with great care in small soft materials; it is perfectly preserved. The transition from the square to the octagon is very skilfully arranged, but one does not find the happy proportions of the relative heights of stories of this edifice, that are presented by the towers of Ile-de-France. The story of the belfry has not sufficient importance; t that of the blind arcade has too much, or rather a striking defect of proportions in the equal height of these two stories. The four gables at the base of the pyramid are very moderately arranged; the octagonal story below is poor, and the four pinnacles are mean. Yet the entirety of the edifice produces in execution a very happy effect, and which atones for the defects of the details is the general outline studied w with refinement. The horizontal lines, so necessary in every stone edifice to give the idea of stability, and to indicate a structure built in courses, does not interfere with the entasis, that from base to apex gives a line successively receding without abrupt changes. The four pinnacles, whose apexes exceed the top of the upper cornice, more by the perspective effect than the elevation, connect the square base to the pyramid. One feels here a very delicate art, a serious study of effects. This tower of S. Germain of Auxerre must serve as a type for many others erected in the vicinity about the end of the 12 th century. At Vermanton still exists a charming tower, that dates from the first years of the 13 th century, built according to the same details but much more elegant; the pinnacles already have openings,and the archivolts of the openings

architecture of that epoch and of the province of Burgundy, f fluted pilasters nearly everywhere replace columns supporting the archivolts. The bands are either with corbels or are decorated by those little arcades so common in the Carlovingian architecture of the Rhine. The blind arcade of the lower story at B and the construction with stories of great size, a s sort of facing of a mass, are very frankly Burgundian. But wh what should not be omitted is this band D, panelled with rosettes and relief ornaments, that seem to be antique fragments set in the construction. We give a detail of it (67). Further the appearance of this tower is majestic, what it can be reproached with is a certain heaviness, and that division of the belfry in two stories of equal height and similar in decoration. But it should not be forgotten, that at the epoch louvres were not placed in the openings of belfries, and that architects sought to protect the internal carpentry supporting the bells by subdividing the openings as much as possible, while making up by their number for the narrowness of their openings. Yet on the banks of the Rhine from the 12 th century, as we have seen above, the architects sought o make the tops of the towers lighter by terminating them by octagonal stories. Burgundy followed the advance, that made its way in the other a adjacent provinces.

At Auxerre we find two towers, interesting from the point of view of the various influences, that reacted on the frontiers of Burgundy, and tended to modify its native architecture. One was the old tower of the abbey church of S. Germain, built during the first half of the 12 th century, that almost completely abandoned Burgundian traditions to adopt a mixed style, that belonged to Ile-de-France or rather Champagne; t the other being the tower of church S. Eusebe, but built later about 1160, remaining frankly Burgundian. The old tower of church S. Germain of Auxerre, called the tower of S. Jean, w was built at one spurt from base to the apex of the spire, a and it is rare to find towers of that epoch and of that part of France retaining their primitive covering. It flanked the old facade of the abbey church, and at bottom rested on a square tower without openings, except an arch giving entrance to the ground story.

We give the elevation of this tower (68). The construction

with eight similar dormers on the eight faces of the pyramid. The geometrical combination and the trace of the various members of this tower are indicated in Fig. 65 at A, at the level of the pinnacles with their little cross vault, whose groin arch C rests on the head inserted above the opening D; at B directly over the pyramid; this plan B shows the direction of the augles of the pinnacles and the entersections of the dormers, with their valleys in the pyramid of the spire.

We must leave aside for an instant the towers of Ile-de-France or the adjoining provinces to examine how at about the same epoch, i.e., from the 12 th to the 13 th centuries, the provinces distant from that centre of architecture transformed and passed from Romanesque to Gothic forms. In these provinces the transition was longer and less decided, and the revoltion was only complete, when the purely French schools reacted on the most distant provinces from the centre of the beautiful and good Gothic architecture. Our reader

Our readers have seen that the central towers of the Saone and Saone-et-Loire, which belong to the Burgundian style, were a combination of the Carlovingian traditions from the Rhine and local influences produced by the presence of Roman monuments ; that is why we have placed on our map (Fig. 58) the c centre of that school at Autun. But at Autun itself exists no tower preceding the 15 th century, which has any value; it is necessary for us to find the Burgundian types of the beginning of the 12 th century at Beaune and Saulieu. At Beaune a central tower presents a primitive story possessing all the characters of the Burgundian Romanesque type. The church of Saulieu retains its two facade towers nearly entire in the same character. We find the very developed Burgundian type at Charite-sur-Loire, although a littel mixed. The abbey of Charite-sur-Loire dependant on the order of Cluny, built in the first half of the 12 th century, like all the churches of that order was preceded by a vast vestibule, over the side aisles of which rose two great towers, one of these towers still entirely exists, except the crowning, which is of carpentry and of a more recent epoch.

Here (66) is a perspective view of this tower, taken from the interior of the vestibule now destroyed, and where the springing of the vaults is seen at A. Here as in the architec-

those having had occasion to erect edifices of this kind know how difficult it is to obtain happy effects. And modern times in which has been sought this general harmony, that perfect accord of lines, and at the same time a picturesque effect, are those to demonstrate for us that but rarely is attained this perfection. The passage from the vertical parts to the inclined planes of the spire is an obstacle against which are shattered the efforts of constructors. Architects from the e end of the 12 th century studied with great care and executed with skill these important parts of their spires, and all the preceding examples here given show, that if finally they completely succeeded, this was not without long experiments, not always crowned by success. They had behind them traditions and examples more or less happy, but in great number, that c could serve them as guides; while for us today it is necessary to seek scattered models, whose original types we cannot find, and to base ourselves on examples, that present to us only superfluities of different styles or of various epochs. Then too frequently one allows himself to be seduced by the appearance of harmony, that time has cast over structures formed of dissimilar elements, and one is not greatly surprised, when after having erected a tower copied from those structures, he has only produced an ungraceful and incoherent assemblage with unfortunate outlines. Every architectural part outlining itself directly on the sky requires forecast, and more yet an exquisite feeling for form, for nothing is indifferent in such a position' the least detail assumes proportions different from those obtained on paper or on the geometrical drawing, and very long experience of the practical tendency of effects to prejudge the perspective appearance of the general combination.

After having sought to produce surprising effectr by complex means, as it always happens, the architects soon perceived t that the simplest general combinations are most proper to give the idea of grandeur. The tower of the cathedral of Senlis th that appears so great, although of very ordinary dimensions, whose perspective effect is so elegant and with such happy ou outlines, is a perfect simplicity of combination. The octagon of the story of the belfry and the pinnacles are exactly inscribed in the square base; four long openings serve for sound

the bells to pass. Three other smaller openings are in the o other sides beneath the pinnacles, as indicated in Fig. 64. This figure shows us the arrangement of the open pyramids crowning these pinnacles; their axes do not correspond to the axes of the pinnacles; but these pyramids rest on the faces of the vertical octagonal story, as if to serve as buttresses. This deviation from the axes of the pyramids, although quite eccentric when one examines the pinnacles separately, produces a very good effect of the whole, for it leads the eye from the square base to the inclination of the sides of the great crowning pyramids, as shown by our Fig. 63. The upper pyramid of eight sides like the tower receiving it, bears on each face a great dormer, whose opening allows the escape of the sound of the bells. These dormers are in a beautiful style; the perforations decorating their angles and tympanums are cut with sharp angles, and produce much effect at the height where placed. One will note that the little stone roofs crowning the dormers are cut with ridges next the spire to detach it. (Fig. 63). The spire and the roofs of the dormers have cut scales, and the angles of the great pyramid have numerous crockets. That is an innovation belonging to the 13 th century, and which tends to destroy the dryness of these long inclined lines of the spires. Before coming to furnish the angles of the spires with leaf crockets, a sort of inclined cresting, the architects had made other experiments. At S. Leu d'Asserent not far from Senlis is a spire built about 1160, whose pyramid p presents that peculiarity of chestings detached from the spire, connected to it only by rings, like inclined columns. But that singular means, employed to avoid the dryness of a straight line detached against the sky without transition from t the solid to the void, was not imitated. Above the dormers a are eight slots pierced at the middle of the sides of the pyramid, which still lighten the upper part of the tower. What cannot be too much admired in these compositions is the skill with which the architects led the eyes of the observer from a massive square base to a sharp and light crowning, while h reserving projecting points profiled outside the general outline, destroying the monotony of the great lines, yet without changing them. From this point of view the spire of the cathedral of Senlis is a work worthy of being studied with care;

destroyed the cathedral at the end of the 12 th century. In the 13 th century was placed at A an arch in one of the twin openings of the belfry for the passage of the great bells. T This fact is curious; it indicates either that before that epoch the bells were raised in the towers during their erection, or they were of small dimensions, as we said above.

We could also furnish numerous examples of these towers of the epoch of transition built in the vicinity of Ile-de-France; but it is necessary to limit ourselves. It remains to us to show how the architects of the 13 th century knew how to profit by the experiments of their predecessors, and apply the principles originated in the provinces of the West, East and North, to the new method of construction introduced at the end of the 12 th century in Ile-de-France.,

One of the rare complete towers from the beginning of the 1 13 th century is that which flanks the facade of the cathedral of Senlis at the southern side. We give a perspective view of it.(63). Built at one spurt during the first years of the 13 th century and of materials excellent in quality, this tower already shows us the tendencies of the architects of the 13 th century to seek surprising effects. Rising on a nearly solid square base, but beneath which opens a charming portal opening next the south side aisle of the cathedral (Art. Porte), contrary to the habits of the preceding builders, this lateral tower is no longer a detached monument; it intimately participates in the plan if the church; its ground story serves as vestibule to one of the side aisles. Already the lateral towers of the abbey church of S. Denis erected by abbot Suger pr presented that arrangement, which appears to have been adopted in Ile-de-France from the 12 th century. Above the ground story is a vaulted story, lighted on each side by twin openings; then immediately over that story rises the belfry with octagonal plan. A stairway A, placed in a strengthened angle and no longer independent as in the preceding examples, gives access to the story of the belfry. Great open pinnacles placed on the angles of the square serve as transition from that square base to the octagonal story. One of these pinacles contains a round tower B, which encloses the top of the stairs. Four long openings open in the entire height of the belfry in the four faces parallel to the square, and allow the sound of

very probable that one of his colleagues conceived and built the tower of the cathedral known under the name of S. Romain. The tower of S. Romain of the cathedral of Rouen is contemporaneous with the old tower of Chartres (1140 to 1160). The primitive termination of that tower exists no longer, or was never erected. It must probably have consisted of a great octagonal pyramid, like the terminating one of the stairway of the same tower. However that may be, the tower is entire and is certainly one of the most beautiful of that part of France; it presents a mixture of the two styles of Ile-de-France and of Normandy, in which the first element dominates; there also t the French artist is subject to the local influences, but he has evidently brought the taste of his school and his own genius.

Here (62) is the elevation of the tower of S. Romain on the east side, where is found the stairway leading to the base of the belfry. The tower of S. Romain of the cathedral of Rouen is detached on three sides and starts from the ground, like most towers of facades before the 13 th century. Like that of Chartres, it is internally composed of two superposed vaulted halls, and a belfry story divided into two. But here the mean arrangements are confused, the division into stories of equal height of Norman towers was adopted by the French master of works; submitting to these customs, still he has diffused in his work the grace and refinement, the study of details, the moderate projections, the perfect harmony of the mouldings a and sculpture with the whole, that belong to the school from which he came. He has very skilfully arranged the solids and voids, giving more importance to these and increasing the scale of the details as the tower rises from the ground. These details are of great beauty, the construction is executed in small materials with the care that the architects of the 12 th century took in all their buildings; the mouldings project little and produce much effect in spite of their extreme refinements; the buttresses are skilfully placed and profiled. T The stairway on the east side deranges the arrangement of the openings, but is a masterpiece of architecture. The construction of the tower of S. Romain of Rouen, although very light b by reason of the extraordinary dimensions of the edifice, has suffered no alterations but those produced by the fire, that

Aisne, where Gallo-Roman traditions were so long preserved? Or did he indeed come from the banks of the Seine and the Eure between Paris and Rouen? We should incline to that last origin, for one finds in the details of the tower of Chartres, in the mouldings of the arches and in the sculpture, the refinement and grace belonging to that portion of the Frence territory. In the basins of the Oise and the Aisne toward the e end of the 12 th century, the mouldings are more simple and retain less of Gallo-Roman traditions, the sculpture is barbarous and sins by contempt for form. Hhe Merovingian influence persists very late in the last provinces, while in the part of Ile-de-France compresed between Paris, Mantes and Dreux, was formed a separate school from the 11 th century, whose taste is gradually purified until about the middle of the 12 th century, that avoids exaggerations and proceeds with assured steps toward an art full of elegance and refinement, delicate and restrained. An architect leaving that school in the middle of the 12 th century, finding in Orleanais the last traces of the arts of the provinces of the southwest and some elements of those of Normandy, brought just what was necessary to build the old tower of Chartres by combining his own qualities with the Romanesque influences, that had entered that province. It indeed is curious to observe at that epoch and still later at the beginning of the 13 th century, how the architects of Ile-de-France, although they were in advance of the adjacent schools, bent toward the local traditions, when called outside their centre. It was only at the end of the 13 th century, wh when architecture had accepted actual formulas, that the flexibility of the artists vanished entirely to give place to an art, which took account of neither traditions nor of local customs, but resolutely advanced in the path it traced. As for us, we prefer flexibility to these invariable formulas, to t the enexorable logic, which forces art to throw itself into the abuse of its own principles to not fall into monotony; so our readers will pardon us for extending to such length on t the epoch of transition and research, even of experiments, an epoch much more varied and fertile in instruction than the s succeeding one.

If at Chartres an architect of Ile-de-France conceived and superintended the erection of the old tower at Rouen, it is

it found open these communications betweey provinces of different origins, customs and language, and it caused the rapid penetration of the arts of the royal domain with the new political institutions. Thus is explained how Romanesque architecture was suddenly paralyzed at that epoch; how these provinces of the West, East and South received the influence of the royal domain by the same routes, that had served them for two centuries in extending outside the traditions of their own arts.

The old tower of the cathedral of Chartres summarizes the e efforts, tastes and traditions of the two principal schools of Gaul, whose history and influences of greater or lesser e extent we have just traced. It possesses both the grandeur of the conceptions of the artists of the West and the power of their structures, the advantageous boldness of the Norman architects, the sobriety, refinement and instinct for harmony of proportions, which was the portion of the constructors of the royal domain, of the valleys of the Seine, Oise and Aisne. The name of the architect who knew how to fuse in a single e edifice these different elements is not known; but his imperishable work, whose chief merit is unity, proves to us that this quality depends far more on the genius of the artist, t than on the elements placed in his hands; that the use of different elements in themselves do not exclude originality, when these materials are gathered by a just mind, and properly organized head and skilful hand. There are other towers in F France that scarcely yield to the old tower of Chartres in importance; but none that combine in such a high degree happy p proportions with the accurate interpretation of a programme, moderation with richness, the application of traditions foreign to each other to a single edifice without apparent effort. To see that spire, nothing seems more simple, more easily conceived and executed, and yet if one analyzes its construction with some care, he perceives the skilful junctions of the different elements, everywhere a reasoning subject to assured t taste. It would be very interesting for the history of the t transition from Romanesque architecture to the French architecture of the 13 th century, to know from whence came the master of works to whom was entrusted the construction of the o old tower of Chartres, to what province he belonged. Was he born in one of those cities on the banks of the Oise and the

the great commercial routes, that still exist today, ways that have singularly aided the work of the centralization of the monarchical power. Let us take one of the most extended branches, that does not take account of the course of the rivers; for example, that leaving Perigueux, passing by Limoges and e ending at Chartres. Do we not see there the great central route from Limoges to Paris, nearly without deviation? And the other from the same centre, which passes by Angouleme to Poitou to cast itself on the Loire and the Maine, is it not also a great commercial route followed in our day? Does not our w map take account of that natural barries, that the Loire has so long estabcished between the North and South of France? And that line of Burgundy, which from the Marne to Chalons descending to the limits of Lyonnais, unites Aix-la-Chapelle, the Rhine and Moselle to the Rhone by the Marne and the Saone, is it not again the route followed and traced in our time? One cannot claim that our map is traced according to certain preconceived ideas; again the monuments are there; besides these ideas are suggested to us only by the sight of the lines joining the scattered landmahks, that we have been able to mark. In localities where meet two or three branches starting from two or three opposed centrer, we can prove the influence and the mixture of the arts from those ce tres. This fact is apparent at Chartres, Chalons-sur-Marne, Nevers, Toulouse, V Valence, Puy, Auxerre, and Rouen. Our illustrations have or will demonstrate this. The crossing of the two branches leaving Perigueux is apparent at Loches. All those branches indicate routes traced and followed by the commerce of the 12 th century; and without claiming to give this labor an exaggerated importance, we can believe that it can aid in destroying this idea of confusion, of chance intervening in the progress and the development of the arts of this part of Europe; perhaps it will cast some lights on the complex history of those distant times. For us these centres with their branches tending to unite at certain points indicate the first steps of t the peoples toward national unity in the midst of the feudal system; These facts can aid in finding the causes of the wealth of certain cities, whose importance we have difficulty in understanding today. When the monarchical power established itself in the 13 th century on gradually strengthened bases,

Neustria. On our map the Carlovingian divisions are indicated by dotted lines. During the first Carlovingian period, of all provinces of Gaul, Aquitaine is that richest in extent, area and commerce carried on with Burgundy, the North and Brittany. This one also caused to penetrate farthest the influence of its schools of architecture. Neustria was divided by the Norman invasion and assumed but little influence, until the predominance of the French sovereigns. If one carefully examines this map (Fig. 61), he will find occasion to make singular o observations. For example, one sees that in the 12 th century, in spite of the political revolutions succeeding the division of Gaul made by Charlemagne at his death, the peoples retained almost intact their characters of Aquitaminians, Burgundians, Neustrians and Austrasians. Perhaps our readers will think that we assume a very high question in regard to towers; and we should not forget that more than once since the beginning of this work, we have been accused of assuming national arts and schools, that existed only in our imagination; then it is necessary for us to develop our theme, while returning our sincere thanks to those, who have compelled us to collect the data and proofs for illustrating the important question of the development of the art of architecture on the western territory of the European continent.

The tower facilitates this labor more than any other edifice; for more than any other structure it indicates the tastes,and traditions of the peoples; it is the visible symbol of the g grandeur of the city and if its wealth; it is the most visible expression of the civilization of that epoch, both religious and secular; it assumes importance because of the development of the municipal spirit; it is removed from monastic influences more than auy other monument; to say all in one word, it is the true national monument od the 12 th century, in a time when each important city formed a nucleus almost independent of secular or clerical feudalism. The bell tower may be regarded as the sign of hre industrial and commercial development of the cities. The examples that we have so far given a are so many laidmarks that we have indicated, margs placed on the lines traced on our map. The proofs are then material and palpable. Now observe the direction of each of these branches; they follow the course of the rivers, which is natural, or of

crosses the mountains South of the Contal, and expires in Puy-en-Velay. Another vigorous branch pushes North, passes Limoges, at Loches meets a branch of Type A, crosses the Loire at S. B Benoit and extends to Vendome and Chartres. Auvergne also possesses its school; at Clermont at H is its seat. One of its branches ascends the Allier to Puy, where it meets that coming from B. At the South the prototype H throws a branch directly along the Garonne to Toulouse and Agen, and lower to Mas d'Agennais. On the North it scatters its branches fan-like across the plains of Limagne; one branch even extends to Nevers, another being abruptly stopped by the mountains of Lyonnais. T These three types occupy all the ancient Aquitaine of Charlemagne, and throw some branches even into Neustria. The Carlovingian prototype, whose seat we have placed at C in Aix-la-Chapelle, invades the Meuse, Moselle and Rhine; it pushes a branch across the Ardennes and even on the Marne to Chalons, another to Besancon, and one in Flanders to Tournay, ascending the Sambre and descending the Escaut; it occupies Austrasia. The Burgundian prototype, that we place at D in Autun, throws a branch across the Morvan and seeks the valley of the Yonne and descends the river to Auxerre, where it stops. Another b branch passes below Chateau-Chinon along the mountains, crosses the Loire at Charite, places several branches in Nivernais and loses itself before reaching Bourges. A third lively branch casts itself on Beaune and Dijon, reaching Longres, then crossing the mountains descends the Marne to Chalons. A fourth seeks the Doubs and ascends toward the East to Besancon. Finally the fifth follows the valley of the Saone and extends to Valence, passing by Lyons and Vienne, meeting a branch of prototype I, placed at Arles. School D occupies the ancient Carlovingian kingdom of Burgundy. The type belonging to Ile-de-France, whose centre is placed at E in Paris, throws branches all around itself; northeast to Rouen; North to S. Omer, Tournay and S. Quentin, ascending the Oise; East to Rheims and Chalons; southeast to Troyes ascending the Seine and to Sens, ascending the Yonne; South to Orleans and West to Chartres. Finally the Norman type, whose centre is placed at G in Caen, branches to all sides, northwest to Eu, West to Dol, and ascending the Orne, descends the Eure to Evreux. A branch passes the tsraight and covers England. The two last schools occupy

facilitate for our readers the classification of the different schools, their course and their progress. The erection of towers also does not rigorously follow the styles peculiar to each territorial division.

Until the end of the 12 th century, the tower is still a separate edefice, and monastic establishments, cathedrals and parish churches frequently annexed to the church a tower, whose primitive type was in intimate relation to the local style. During that period of the middle ages, the tower is rather a monument of vanity (if we may be allowed the expression), than a monument of utility; it is then not surprising, that men should sometimes wander from local traditions to obtain the satisfaction of erecting an edifice capable of rivaling those of some city or monastery, which excited the admiration of strangers. The classification of towers by schools and ramifications of schools coincides in the provinces with the commercial and political relations; this classification follows the natural movement of these relations; from the point of view of history it may then be useful. Thus before going farther, and finally to summarize for our readers what we have said on these monuments, we give on the next page (61)-a map of France, on which we have marked the central points of the different types of towers and the extent of their ramifications about the middle of the 12 th century, before the great architectural revolution in the reign of Philip August; a revolution tending to substitute a single school for these schools of different origins.

We have said that Perigord possessed from the end of the 10 th century and the beginning of the 11 th two types of towers: that of S. Front marked A on our plan, Fig. 61, and that of Brantome marked B. The prototype A sends South a branch along the river of Isle, extends on the banks of the lower Dordogne, and ascends the Garonne to Toulouse; a branch penetrates to Cahors. The influence of type A extends farther North; it invades Angoumois, Saintonge, Aunis, and Poitou, descends the Vienne ayd is prolonged to the North toward Loches, then ascends the Indre to Chateauroux (tower of Deols). That branch passes the Loire between Tours and Orleans and is lost in Maine and Anjou. The second type of Perigord B, of which Brantome is the oldest model extant, ascends the valley of the Dordogne,

angles of the tower. The four gables crowning the dormers also have their utility and are not merely a simple decoration, t they load the four faces of the drum parallel to the sides of the square, so as to give a powerful resistance to these faces with the octagonal base. The last story (Fig. 60) is as l light as possible; the jambs are thin and the vibration of that story is perfectly resisted by the pinnacles forming projections, yet the inside dimensions of the base of the spire are not less than 33.5 ft. inside. The execution of the details are treated with special care, the courses are perfectly regular, the jointing being very skilful, the mouldings and sculpture are of the greatest beauty; nowhere is the architect found at fault, and one cannot instance the negligences so common in the structures erected a half centu-
ry later. All is foreseen and calculated, nothing left to chance; the discharge of water is simply arranged. Thus the ol d tower of Chartres, although it may be fifty years older than the rest of the cathedral, and that it has suffered the test of two fires, will still be standing when the church will be fallen in ruin. It must have been built from 1140 to 1170, a and the beauty of the construction contrasts with the negligence and coarseness of that of the church. The school of the 12 th century in France, from the point of view of execution, was never excelled and rarely equalled by that of the 13 th, in spite of the scientific advances developed during the latter; but we shall explain the causes of this fact in Art. Cathedrale.

Note 1.p.360. See the entirety and the details of this beautiful structure in Monog. de la cath. de Chartres, published by the Minister of Public Instruction and Worship, from drawings of M. Lassus.

Whatever the care that we have taken to distinguish the different characteristics of the towers, that cover the soil of present France until the 12 th century, to indicate the different schools, their crossings and the influences they exercised on each other, we must confess that our work is very brief, that we have left aside details of real interest. However in our eyes this question has too great importance; it is connected too much with the spirit of the middle ages, and to the efforts of constructors, that we should not attempt to facil-

but rests on a drum with octagonal base, the triangles left free between that story and the octagonal drum bear four pinnacles forming as many openings. Four dormers are pierced on the faces of the octagon parallel to the sides of the square. As at the Trinity of Vendome, four great gables surmount these domes and are themselves pierced by openings, so as to permit the sound of the bells to escape from the belfry. But these gables skilfully encroach on the faces of the pyramid, to as to connect the vertical parts with the inclined surfaces; this is an advance. At the Trinitw of Vendome one sees that the upper stories are again intersected by horizontal lines, that separate the lower arrangemen of the belfry from the p pyramid, although these two parts are not separated by the f floor and form a single whole. At Chartres the architect has made it perfectly understood, that the belfry and the pyramid are only one story empty from bottom to top. An immense spire is decorated by ribs on the angles and faces with scales as at Vendome, and terminates this tower. There is no need to emphasize the beauty and grandeur of that composition, in which the architect has made proof of rare moderation, where all t the effects are not obtained by ornaments, but by the true a and skilful proportions of the different parts. The difficult transition to be established between the square base and the octagon of the spire is managed and carried out with a skill not surpassed in similar monuments. Perhaps one can criticize the angle buttresses of the square tower for ending too abruptly beneath the band K; but in execution this defect appearing on the geometrical drawing is completely obviated by the small projection of these buttresses, that no longer counts at that height, and by the play of the shadows of the dormers and pinnacles, that harmonize in the happiest manner with the projections of the openings of the square base. The trumpets supporting the spire only spring above the openings of the f four pinnacles, and the plan (60) taken at the level L shows with what skill the constructors knew how to cause the octagon to intersect the square. The four angle pinnacles, instead of being only an ornament as in Romanesque towers, like the tower of the Trinity at Vendome, are actual buttresses, well loaded, that transfer the weight of the four sides to the octagon, parallel to the diagonals of the square, to the four

the facade of the church were brought to the line of the front of the towers only after that time, although no vestige of t this appears." Pintard is in error, the vestiges of the old arrangement of the porch are perfectly apparent, and the opinion of "some persons," that he cites is very proper. The editor of the Livre des miracles de Notre Dame de Chartres (manuscript of the 13 th century in verse), M. Duplessis, believes that the spire of the old tower of Chartres is later than the fire of 1194. But that opinion is contradicted by the character of the sculpture and mouldings of that spire and by its construction. Before the fire of 1836, we saw in the interior of that spire traces of the fire of 1194, which only burned the old bell cage, probably of little importance, traces absolutely the same as there still visible inside the square story b below that spire.

Here (58) is the plan of the old tower of the cathedral of Chartres at the level of the ground story. At A is a great v vaulted hall, that formerly opened on the porch B, and that today opens on the first bay of the nave, the gable of that nave having been advanced from C to D at the beginning of the 13 th century. According to the custom of Romanesque constructors (a very wise custom), the private stairs at E to the tower is outside the walls and did not weaken the structure. That lower story is built of enormous materials from the quarries of Berchere, that furnished a limestone of incomparable hardness and solidity. Fig. 59 gives the elevation of this tower,[1] whose height is 339.5 ft. from the base to the foot of the i iron cross, that crowns the spire. Here one recognizes the superiority of this structure over those erected at the same e epoch in Normandy. The division of the stories is skilfully calculated according to the internal arrangements and causes the mass of the monument to appear greater and even more imposing. The lower hall is well marked by the false arcade of the first band G. Above is a second more open hall of the same height, but whose external surfaces and openings are richer; a second band indicates the level of a second vault. Then comes the belfry, whose base rests on that vault at the level H. (Art. Beffroi). The story I is more open and more decorated t than the third story, it serves as a substructure for the spire adjoining it; that spire does not commence abruptly but

Maine and Anjou; except that these last provinces preferably gave an octagonal base to their spires.

We do not believe it necessary to give here the towers of the church of the Trinity at Caen, that are in the hands of everyone. From the architectural point of view, the composition of these towers is quite mediocre up to the bases of the spires, whose construction only dates from the 13 th century. Their division into stories of equal height is not happy, there is a defect in proportion, that is found only in that province and on the banks of the Rhine; yet the construction the Norman towers are remarkable; almost always built of small m materials perfectly dressed, they have retained their verticality, in spite of the small area of the bases in relation to the height. But the Normans had not that instinct for proportions possessed in a high degree by the architects of Ile-de-France, Beauvoisois and Soissonais. Always the boldness of t their structures, their perfect execution, the elevation of the spires, evidently had an influence on the French school, properly so-called, and that influence made itself felt in t the old tower of the cathedral of Chartres. That like all Romanesque towers rises from the ground, i.e., rests on four s solid walls. Originally like the adjoining tower unfinished and completed only in the 16 th century, it flanked a porch that preceded the South side aisle of the nave; it was thus detached from the church on three sides.[1]

Note 1.p.359. At the beginning of the 13 th century, this porch was suppressed, the gable wall of the nave being extended to the western surface of the towers, which caused them to lose their primitive appearance.(Art. Cathedrale). This was probably after the fire of 1194, that this gable wall was rebuilt in its new position. Of the monument commenced by Fulbert and completed about the middle of the 12 th century, there remained standing after the fire, only the two towers of the western facade. The low porch, covered by a terrace connecting them, was suppressed, and the new nave of the 13 th c century was extended to the outer surface of the two towers. Pintard in his Histoire chronologique de la ville de Chartres says, p.193: - "In the year 1145, the two great towers were built detached at the end of the nave, according to the idea of some, who were persuaded that the enclosure of the nave of

We give (57) the horizontal plan of the spire of the Trinity taken near the level of the pinnacles. Those, as shown by the plan, are borne on little columns alternately simple and reinforced by a little square pier; their plan is circular. There is still a last vestige of the traditions of Perigord. One will note that the stone stairway attached to the tower only ascends to the top of the vault of the lower story.(F (Fig. 53). Conformably to Romanesque customs, one ascended i into the bell cage only by means of wooden ladders.

From the tower of the Trinity of Vendome we have come to t the old tower of the cathedral of Chartres, the largest and certainly the most beautiful of the monuments of that kind, that we possess in France. Admirably constructed of excellent end well chosen materials, it has suffered terrible fires and has seen seven centuries pass without having suffered visible alteration in mass and details. But before describing the last tower, it is well to make known its various origins.

We have seen at Vendome, that the influence of the monuments of the West still made itself felt. At Chartres that influence is less apparent than at Vendome, but on the other hand the Norman style and that of Ile-de-France takes a greater place. Until in the 13 th century, Norman towers not placed over the crossing rise from the ground, like the towers of the East. These are square towers strengthened by buttresses of slight projection, narrow compared to their height, pierced with rare openings in their substructures, decorated by blind arcades below the belfries, presenting at top a series of stories of equal height, terminated by square pyramids.

The two beautiful towers of the abbey church of Trinity at Caen, those of the cathedral of Bayeux, in spite of the additions and modifications in the 13 th century, retain the very frank character of the Norman tower during the 11 th and 12 th centuries. We do not think that the Norman towers of the beginning of the 12 th century possessed very great height, and the tower of the church of Thaon before given is there t to confirm our opinion, since its cons ruction does not precede the end of the 11 th century. But about the middle of the century, Normandy preceded the French provinces in erecting the first pyramids of excessive sharpness on the square towers of churches. This system was promptly adopted in Ile-de-France,

completely. That is very wise and shows how in some years the heavy Romanesque constructions were transformed under the influence of the new schools. The tower of the Trinity of Vendome is perhaps the first erected on a fixed programme. It is no longer a tower for a sort of defense on which has been built a belfry, it is no longer a porch surmounted by halls and terminated at top by a loggia; it is an actual bell tower built from bottom to top for placing bells, an enclosure for bells, resting on the bearing of the bell cage. While retaining most of the Romanesque forms of construction, it belongs to the new school; it replaces the passive resistances of Romanesque construction by elastic resistances, equilibrated a and living (excuse us for the word to express our thought) of French construction. This principle once discovered and employed had consequences to which architects placed as limits only those given by the properties of the materials, and again they sometimes exceeded these materoal limits, thanks to their desire of applying the principal in all its logical rigor.

Note 1.p.355. These effects are apparent in nearly all Romanesque towers, particularly since they have been furnished with very heavy bells rung with wide swing. Let us not forget, that we stated in commencing this Article, that bells until the 12 th century were small, and that they were not intended to be swung widely. The tower of the Trinity of Vendome is a also interesting to study from that point of view, since it evidently indicates by the manner of its construction, the l location of heavy bells rung with a wide swing.

Let us now see the exterior of the tower of the Trinity. (56). Although the openings are covered by slightly pointed arches, its appearance is Romanesque; its octagonal upper story below the spire recalls the terminations of the towers of Brantome and of St. Leonard with their solid gables above the principal openings, and the pinnacles of the towers of the W West. The archivolts of these pinnacles are round, as well as those of the arcade below the pyramid. But the pyramid becomes very acute; it is reinforced by projecting ribs at the angles and the middles of its faces, it is no longer built of rubble, according to the old Romanesque tradition, but of well dressed stones, and has for that enormous height a thickness of only about 1.6 ft. at its base and 1.0 ft. at top.

system of arches. The sides J of the lower cloister vault are not useless; they take the place of timbers placed at the angles of the radial members and termed ties; they prevent the movement of the entire system, connect and stay the angles of the masonry base. Means so powerful must have a motive. This motive was to support on the central pier the four transverse arches I and the thinned wall K an enormous bell cage of carpentry, for which the upper part of the tower served as an enclosure. Constructors had learned, as they gave greater height to their towers, that for carpentry bell cages moved by the swinging bells was required a stable point of support near the base of the tower, where the heavy and loaded construction had nothing to fear from the unequal pressures of the bell cages. Now these four transverse arches and the recess bore the lower sills of the bell cage, and this construction in stone, well abutted and shored, still retained a certain elasticity. Above this base the enclosure or upper part of the tower could be light, not being subject to any vibration; and indeed, the tower of the Trinity of Vendome, if compared with the preceding towers with sections given, is very light in regard to its height, which is considerable. (About 262.5 ft. from base to top of spire).

Until then in Romanesque towers a simple recess, holes in the internal surfaces, projecting corbels or a domical vault received the sills of carpentry bell cages; gradually by reason of the movement in vibration taken by these bell towers, the construction was dislocated, cracks appeared above the upper openings, the angles of the towers were strained and ended by separating from the faces.[1] If the carpentry for the bells rested flat on a vault with filled haunches, the little elasticity of such a bearing produced effects more injurious than the recesses or corbels on the internal surfaces. For these vaults being sometimes faced one way, then the other, first were dislocated, and soon produced irregular thrusts. The bearing system for the bell cage adopted in the construction of the tower of the Trinity, by its complexity even and the contrary pressures of the lower arches, because these two stories of arches separated by a pier, possessed an elasticity equal to its resistance, and so divided the alternating pressures of the carpentry bell cage, that it came to neutralize them com-

of the territory, when it concerns recognition of the different schools of architecture in the 12 th century. At that epoch Normandy, Maine, Anjou, part of Poitou and around Chartres, possessed a school of constructors, that did not yield in skill to those of Ile-de-France and of Normandy; but they were less independent and were subjelt to the influence of either the Norman style,or the style of the schools of the West.

During the first half of the 12 th century, before the erection of the old tower of the cathedral of Chartres, was built an immense detached bell tower dependent on the abbey church of the Trinity of Vendome. From the point of view of tha construction, and with regard to the style, this tower must ba e examined in detail; it suffers the influence of the two styles, of the ild Romanesque style born in the western provinces, and of the style developed on the banks of the Oise and of t the Seine after the beginning of the 12 th century.

The section of the tower of the Trinity of Vendome (53) explains to us the arrangement of this singular structure, already quite perfect, but where one feels the attempts of artists, who seek new means, and who do not entirely free themselves from preceding traditions. Its base is a square hall, vaulted by a domical cloister vault, with four pendentives at at the angles giving for the plan of the vault an octagon with four large and four small sides. On this vault with pointed section rises at the centre a square pier B with four engaged columns. (See plan of the second story; 54). Four transverse arches A, also pointed, are turned from the pier B to four engaged piers C. But to carry the central pier B with a all security, two crossed arches concentric with the vault rest on the walls of the lower story, and to avoid the rising of these two crossed arches under the weight of the pier, four flying buttresses, a sort of shores indicated on our section (Fig. 53), end beneath the bases of the columns D of the four engaged piers. It would be difficult to make this system of construction understood without the aid of a figure; so we give (55) a perspective view of the interior of this story. At E are the two crossed arches on the extrados of the vault and bearing the central pier; at F are the flying buttresses ending under the bases of the engaged columns of the piers attached to the walls. At G are portions of a wall shoring the

to leave betweem the lower story of the tower proper at the level of the top of the vault of the porch, that originally might well have been furnished with a defensive parapet.

Here (50) are the superposed plans of the ground story of this tower and of the second story, which explain what we have just stated. We give (51) the elevation of the tower of the church of Thaon and its section (52).[1] This is further a charming edifice. At A in our section is seen the stairway ascending from the top of the vault to the upper story. The pyramid has a square base, a form much later found in Norman towers, and is composed of low courses set receding on each other. It is ornamented at its base and at the middle of its groins only by projecting heads of animals. Four dormers, or rather four rectangular openings light it above the cornice. One will note in our section (Fig. 52) the construction of the openings of the upper sotry. Like skilful constructors, the architects of the tower of Thaon have not used through stones in the entire extent of these openings so as not to push against the angles. Five voussoirs only extend through, thus forming a discharging arch above the arched lintels. For the openings of the story beneath, whose buttresses again abut the angles of the structure, and where the load is heavy, on the contrary the constructors have used through stones in the archivolts of the openings. It is ver embarrassing ao knou how was arranged the bell cage in that tower, one of whose angles is cut off by the stairway. We should be led to believe, that a wooden floor was placed at the level of the sills of the upper o openings, the more that the holes for fixing the beams of that floor still exist, and that the bells were suspended from these beams and perhaps from two crossed timbers with ends fixed in the four little openings of the spire. This system of suspension would have been verw primitive; but it should not be forgotten, that before the 12 th century bells were very light.

Note 1.p.350. We owe this drawing to M. Ruprich-Robert.

In maine, Anjou, and near Chartres, the crowning pyramids of towers from the middle of the 12 th century already attained a great height compared with the height of the towers. We have seen at Loches the crowniug towers of the 12 th century possessing pyramids with very acute summits.

It is always necessary to return to the political divisions

from Romanesque traditions, and is the first step toward French art of the end of the 12 th century. The archivolts of the openings are drawn as slightly pointed arches; by an arrangement as ingenious as rational, the angles of the octagonal b belfry rest on the crowns of the eight archivolts of the second story. To fill the triangles remaining between the square and the octagonal stories, the architect has placed seated f figures of angels. The sculpture of this pretty construction is barbarous, but the mouldings are refined, multiple and traced with talent, those of the archivolts extend properly down the jambs. As our drawing indicates, the proportions of the t tower of Tracy-le-Val are elegant, the details are perfectly at the scale of the monument, a quality lacking in most Romanesque towers preceding that epoch. A little stairway in a round tower is placed outside and ascendr to the second story; thence the belfry is reached only by ladders placed inside, as in nearly all Romanesque towers.

Note 2.p.347. This base is only 13.8 ft. outside. We owe t this drawing to M. Boeswillwald, who took the trouble to draw this tower for us.

One of the characters that distinguishes the Romanesque towers of Ile-de-France from those of Beauvoisis and even of Normandy, until the moment of the advent of the Gothic style, is the low and stumpy pyramids of stona Nearly all these terminations have been destroyed in those damp climates; their slopes of little inclination receiving the full force of the rain must have been worn rapidly, and were replaced after the beginning of the 13 th century by very steep pyramids, particularly in Normandy. There exists in that province near Caen a little tower of the 11 th century, originally built over the porch of the church of Thaon, which has retained its stumpy pyramid like those of the Romanesque towers of the West of the same epoch. This tower is for us the more intesesting because still impressed by the defensive traditions of the primitive towers built over porches. Its stairway from the ground story to the vault of the porch is taken in the thickness of one of the four piers, resuming its circular form above the second story only along the opposite pier, so as thus to intercept passage. Further the tower above the ground floor rises behind the internal transverse arches of the porch, so as

themselves from these traditions, attempted certain novel and original arrangements, which must have developed rapidly, and led them to produce works better reasoned, more graceful and less unifor than those of the preceding centuries. The spirit of innovation made its way with more boldness, perhaps in the construction of towers during the 12 th century than in other structures, for the imaginations of architects were not subjected to imperative programmes; it was only essential for thed to find places for the bells and to erect a monument distinguished from its neighbors by an appearance lighter and bolder, by novel and unforeseen arrangements. Then Romanesque a architecture had produced all that it could produce; it had r reached its last limits, and could only continue on the same path, or decline by loading itself with superfluous details. Western genius always being inclined to advance abruptly broke with traditions, and its first attempts are masterpieces. [1]

[1] Our readers shall judge of this.

Note 1.p.347. This movement, produced about the middle of the 12 th century, in the arts and letters, is too marked not to attract attention of all who study the works of that epoch. We have occasion to mention it man times in this Dictionary. It belongs to the modern spirit, being its first and most powerful effort, and we have not yet been able to divine why some distinguished and learned men, who reject popular prejudices but are strangers to the art of building, desire to separate (in what concerns the art of architecture) these tendencies from those of our epoch, and especially not to admit that they bilong to our country, as if this was a defect for us. If we succeed in discovering the cause of this disagreement of these persons and ourselves, we promise to instruct our readers conceruing it.

In the same province at Tracy-le-Val exists a little church, that still retains one of these towers near the sanctuary, w whose construction is a little later than the tower of Nesle. (First half of the 12 th century). Its base is square, plain and detached from the apse without side aisle. On its square base [2] rises an open story which is detached above the roofs. A belfry with octagonal base is built on this second story, and is covered by a stone pyramid. Here (49) is a perspective of this tower, whose system of construction already indicates on the part of the architect the desire of freeing himself

before the side aisles, and partly supported them on the first isolated pier of the side aisle. They rose from the ground; their ground story formed a little hall serving as baptistery or chapel of the dead, if they were placed near the western facade, or took the place of the sacristy and the treasury, if they were built near the sanctuary.

The great abbey churches or very important parish churches frequently erected towers at both sides of the facade and two others near the sanctuary; but the little churches of the 11 th and 12 th centuries being able to have but one bell tower, erected it by preference near the choir. In Ile-de-France and Beauvoisois that arrangement is quite frequent, and accords perfectly with the requirements of worship. The village of N Nesle near l'Isle-Adam has retained a charming church, whose erection dates in the last years of the 1? th century, and that adjoins an older tower (first years of the 12 th century), so as to place that tower at the southern side of the choir. That church is without transepts, and the tower is embedded in the side aisle; it must have been originally detached, and was probably built beside a church with a single nave. The t tower of the church of Nesle is one of the best conceived and best built among the numerous examples furnished by that province and that epoch, most fertile in beautiful towers.

We give its elevation.(48). Above the ground story well based and stable, pierced by a single small window, rise two o open stories destined for the belfry. The stone spire crowning the last story is no longer built on a square plan as at Morienval, but on an octagon whose four diagonal sides are supported by four internal pendentives. This monument of small dimensions is remarkably studied in its entirety as well as its details. One notes how the cornices A and B skilfully join t the heads of the angle buttresses, that are only engaged columns. The sculpture is refined and earnest, only applied to the capitals. The archivolts are simply decorated by chevrons. Mouldings are delicate and excellent in style; everywhere the construction is visible and intimately connected with the decoration. It is unnecessary to say that only the ground story is vaulted. The tower of the church of Nesle is built according to Romanesque data. But already at the beginning of the 12 th century the architects of that province, seeking to free

the porch-tower of the church of Morienval was originally terminated by a stone pyramid with square baseiis, that in the same church the two other towers flanking the choir, conformably to the customs of that epoch,[3] are covered by masonry pyramids as indicated in Fig. 47.

Note 2.p.342. From 859 to 861 the abbey church of S. Bertin of S. Omer was rebuilt, after having been burned by the Normans, and the tower of that new church was terminated by a carpentry structure containing three stories of bells, besides the spire; the whole was covered with lead. (See Les abbes de S. Bertin, d'apres les anciens mon. de ce monast., by H. de Laplace. Part 1. p. 66. 1854. S. Omer.

Note 3.p.342. The towers placed at right oud left of that sanctuary were intended for ringiug, the offices, particularly in abbey churches. Thus in the choir the clerics were within reach of the bells without leaving the cloister enclosure. Bell towers of the facades were reserved for ringiug on festivals, and for calling the faithful from outside.

But toward the beginning of the 12 th centuryin the new plans of churches built at that epoch, men ceased to erect towers over porches; as that was a reminiscence of the disastrous times of the Norman invasions; the reasons causing the erection of those towers no longer existed. Towers so placed o obstructed the windows, that could be opened in the western gable walls; they compelled making the porches narrower; they narrowed the entrance of the nave, and to ring the bells it was necessary to ascend to the second story, for the ringers could not remain in the porch and thus obstruct the passage of the faithful. The religious in the abbeys, like those serving in the parish churches, preferred to have towers near t the sanctuary, and if they were erected on the facades, this was at the side and communicating with the side aisles, so as to leave entirely free the entrance to the church. (Art. Eglise). By a very natural requirement of symmetry, if towers w were built beside the facade or at the flanks of the sanctuaries, instead of a single tower, two were frequently erected, and far from retaining the traditional appearance of a defensive tower, men sought on the contrary to render them elegant, so that their mass should not appear to crush the church buildings. Yet men did not dare at first to place them directly

years; from the point of view of the art, what immense progress! We shall attempt to follow step by step the course of t this advance; for if Gothic architecture was born in these provinces, in the execution of its towers particularly appears its resources and the prodigious fertility of the imagination of its artists, at the same time as their science and t their taste.

We shall first take as one of the most complete types of French bell towers the porch-tower of Morienval built at the end of the 11 th century. Its base is that of the Carlovingian towers of S. Germain-des-Pres and of Poissy.[1] That base, e excluding the projection of the buttresses, is only 19.7 ft. square outside. According to the custom then adopted, it rises plainly, except the arches of the porch, to the height of the cornice of the nave. Above that level A is a second story pierced with a double arch on each face, then a third story also opens, which serves as a belfry.

Note 1.p.342. Recent restorations have taken from the base of the tower of S. Germain-des-Pres all its character; but n not long since it existed nearly entire, except an outer portal of the 18 th century.

Here (45) is an elevation of this tower, which must have o originally been crowned by a stone pyramid of four sides; for it does not appear, that the towers were covered by carpentry roofs before the 13 th century,[2] unless perhaps in Normandy and in Flanders. One feels already in that simple structure the impress of an artist of taste. The buttresses reinforcing the angles and the lower part stop at the proper height to permit the belfry to detach itself on a square base. The story of t the belfry itself is rendered more elegant by engaged angle shafts, that break the dryness of the sharp edges. The little order supporting the archivolts of the upper openings has a happy proportion, and the plan of the piers is light and stable.(Fig. 46). The crowning cornice is composed of a slab supported by carved corbels, and is refined and rich at small c cost. Although very simple from base to summit, this structure still produces its effects with skill, reserving sculpture for the upper parts and leaving nothing to caprice; it employs only materials of small dimensions, and leaves for the bells the largest possible openings. What causes the assumption that

and in its turn erected monuments larger than those of the L Loire, Poitou, Perigord and Saintonge. Yet is seen to appear in the provinces properly French from the beginniug of the 12 th century, a style of architecture that yields in nothing to the style adopted in the West and the Centre. Not by extraordinary dimensions and colossal structures did this architecture make itself noted, but by a harmony of proportions, refined and earnest execution, happy and already bold arrangements. The towers furnished architects with a programme, which required all their science, and that lent itself to the development od their natural imagination; for this programme was much less restricted than that of the other parts of religious, civil or military edifices, and allowed the use of new f forms, opening a vast field to artists endówed with a vivid imagination. The extent that we are obliged to give to this Article sufficiently indicates how the constructors of the middle ages, according to imported or local conditions and to their own genius, have been compelled to vary infinitely the forms, that they gave to the monuments, which were not only the result of an imperious need, but much rather a work of a art. Thus the stone towers excited the imagination of architects during the middle ages.

The western school scarcely proceeded from types adopted a about the beginniug of the 11 th century; it quickly reached a complete development and ceased to advance about the middle of the 12 th century; it died with Romanesque architecture. The eastern school with its seat on the banks of the Rhine w was struck by sterility after its first attempts; it only reproduced infinitely its first experiments; imagination was e entirely wanting to its artists; one cannot detect a real advance in the conception of Rhenish towers, and the most beautiful and best understood are perhaps the oldest. In France on the contrary, i.e., in the royal domain, the Romanesque tower successively drops its traditional forms during the course of the 12 th century, and at the end of that century creates conceptions of great beauty by a series of attempts indicating the happy effects of artists filled with imagination and sense. From modest square towers of the end of the 11 th century, built on the banks of the Seine, Oise and Eure to the old tower of the cathedral of Chartres is only an interval of fifty

the vault of the second story intended for the passage of the cords required for ringing the bells; in this case the fourth story B only served as a wathc tower. The tower of the Church of Lesterps has an enormous importance in comparison with the nave with side aisles preceding it; it is by itself alone a monument, an elevated keep with the purpose of imposing by i its mass and of viewing the country afar. But the stairway a attached to the northwest angle ascends only to the second story, and we do not know how the constructors intended to reach the upper stories. It is difficult to know today for what could be utilized the beautiful hall of the first story; it opens on a gallery E looking into the nave. That structure is very beautiful and well reasoned; overhangs are carefully avoided, although the stories are recessed behind each other as shown by the section (Fig. 44). The influence of the two schools of Perigord makes itself left again in the colossal structure, admirably treated. To complete the tower of the po porch of the church of Lesterps, it is necessary to seek examples in analogous monuments subject to the same influences. Now we have given the tower placed on the nave of the upper (old collegiate) church of Loches; its crowning (Fig. 28) may serve to complete the tower of Lesterps.

Note 1.p.340. This monument was drawn by M. Abadie, architect; to him we owe the drawings reproduced here.

Id porch-towers of churches of Ile-de-France could have been employed for defense, it does not appear that they ever had in area or height an importance equal to those of the provinces of the West and the Centre. The naves of the churches of Ile-de-France and of the adjacent provinces were generally quite narrow, and the porch-towers did not extend before the side aisles. The base of the lod tower of the abbey church of S. Germain-des-Pres at Paris, that of the tower of the collegiate church of Poissy, scarcely occupied more than a square area of 16.4 to 26.3 ft wide. But during the Carlovingian period the provinces of the West and those bordering the Loire were much richer than the adjoining provinces of the Seine, Oise a and Marne; they counted on a very extensive commerce, they w were industrious and possessed the most fertile territory. It was only at the end of the 12 th century, when the French monarchy took a real advance, that Ile-de-France was enriched e

Here then (41) is the plan of the ground story of the tower of S. Benoit-sur-Loire, or rather of the porch, and (42) is its side elevation; the structure was built to the level A; and from the extradoses of the arches above that level A, the old wall has only a thickness of 2 ft. Then it was not intended to raise this wall to a great height; it is only a wall of defense, the thickness of ordinary battlements. All the portion comprised between the level A and the top was never built; that rests on the four internal piers, and according to our hypothesis must contain the bells. Our readers will indeed wish to take our restoration only as a probability.[1]

Note 1.p.336. See the general drawings and details of the tower of S. Benoit-sur-Loire in Architecture du Ve au XVIe Siecle, by M. J. Gailhabaud.

Yet this quincunx of piers, adopted for the plan of the ground story of some old towers, was not always destined to support from the ground the upper recessed story. We have a proof of this, otherwise remarkable, in the construction of the tower of Lesterps. In the ground story the tower of Lesterps, built about the beginning of the 12 th century, presents nearly the same arrangement as that of S. Benoit-sur-Loire, except three tunnel vaults borne on archivolts replace the Roman cross vaults adopted at S. Benoit. Above the ground story rises a beautiful and great hall vaulted as a round-arched dome on an octagonal plan, obtained by means of trumpets placed on the angles of the square. A second story presents the same arrangement in more restricted dimensions. Fig. 43 gives the western elevation of this tower, and (44) the section made on the axis of the porch perpendicular to the facade;[1] at A is the doorway of the nave. A third story B is recessed, but has not been completed or has been destroyed. Thus here at S. Benoit, we are reduced to conjectures regarding the crowning of this tower. It is certain that a third story was pierced by twin openings on each face, and was inserted between the spire and the second story, and that adding the probably height of the upper story of the spire to the existing parts, one would obtain from pavement to the apex of the pyramid a height of about 197 ft. The ridge of the roof of the nave of the church being at D, it is probable that the bells must have been placed in the story C, the more so that an opening exists in

the ramparts of cities being forced, these towers served as refuges for the defenders, like the keeps of castles. In 1105 Robert Fitz-Haimon being besieged in Bayeux by the soldiers of the duke of Normandy, took refuge in the tower of the cathedral. (Old French poem).[1]

Note 1.p.335. Roman de Rou. Verse 16,194 et seq.

The besiegers set fire to the church to comple the captain to yield. Then one will regard in certain circumstances the the towers of churches as fortresses, their use as belfries being only accessory. Thus all towers of facades before the 13 th century retain the appearance of a defensive tower, at least in their lower portion; or indeed it has occurred, as f for example at Moissac, that built in the form of an open porch and surmounted by open stories, they have been equipped with battlements like an external curtain.

Among the most ancient towers covering the entire area occupied by the porch, it is necessary to cite that of the abbey church of S. Benoit-sur-Loire, which dates from the 11 th century. We have seen that the primitive tower of the cathedral of Limoges and that of the cathedral of Puy give us in plan four isolated internal columns, designed to bear the upper s story receding from the lower stories. The tower-porch of the church of S. Benoit-sur-Loire presents the sace arrangement; but here the four internal and the external piers form a regular quincunx, and the entire tower must find itself supported by the gable wall of the nave, by the eight external and the four internal piers. This tower having only one story built on the same plan above the porch, we cannot recognize whether the four internal piers were destined to bear the upper stories of the tower, the belfry, or if these external piers must rise from the ground to the roof; this last hypothesis is less probable, for if one admits it, it is necessary to assume for this tower an enormous height because of the area covered by its lower plan. We incline to believe that the four internal piers being alone intended to support the belfry, t the open story containing the bells, and that the external w wall must receive a terrace from which men could defend themselves afar against assailants, that wished to take possession of the monastery. Illustrations are necessary to make understood what we say here.

Jumieges, although much elevated above the pavement of the ch church, only give a very low story for placing the bells, a sort of loggia with an immense carpentry roof covered by lead or slate. The tower of the church of S. George of Bocherville, most complete of all, and whose outside width is 36 ft, only possesses an upper story indended for the bells with a height of 13.1 ft. The rest of the tower downwards forms a lantern at the centre of the crossing. On the story of the belfry rises a spire of carpentry having a height of 88.6 ft., passing from the square to the octagon by broaches on the diagonals. Each face of the belfry is pierced by three found-arched openings divided by little columns. The spire having great importance as a work of carpentry, we have placed it among spires. (Art. Fleche). The central towersof the abbey of Fecamp presents a similar arrangement; that of the abbey for Men at Caen only retains its lantern of the 12 th century, terminated by an octagonal pavilion of the 13 th century; the central tower of the cathedral of Rouen likewise presents a lantern in two stories, from the 13 th century, above which rises a tower of the 15 th and 16 th centuries, that before the last fire was crowned by a wooden spire covered with lead, erected at the b beginning of the 17 th century.

Whatever the appearance of the great central towers of the churches of Normandy, properly speaking they had not the character of true bell towers, or at least those remaining to us from that epoch very much later than the Romanesque period, and do not offer us complete examples, such as we find in the other provinces composing the France of our days.

It is necessary to return to the bell towers of facades, l lateral, isolated and rising from the ground, and finally to those rising over the side aisles of churches. These present more varieties, if possible, than central towers. The architects being no longer subject to an invariable programme, that of placing the tower on four isolated piers and four transverse arches, could more easily devote themselves to more extended and bolder conceptions. In commencing this Article, we s stated that these towers served for defense at their origin, that thus they retained all the characteristics of a fortified tower, and that in general they were either isolated or placed on the western porch of the churches. In case of siege,

not see that the architects were preoccupied by placing louvre boards, designed to protect the carpentry of the bell cages from rain driven by the wind. This carpentry, at least in the upper story, remaining in the free air, was covered by lead or merely painted. Snow or rain introduced into the tower was collected on a lower sloping slab furnished with gutters and gargoyles. But we shall have occasion to return to that important detail.

The square central towers then persist very late in certain provinces of the Centre; one finds them along the course of the Marne. While in the village of Vernouillet on the Seine was built the pretty tower given above, at Dormans on the Marne was erected a tower, that retained the traditional form of the towers of the provinces of the Centre, although the details may already be entirely Gothic. The church of Dormans is small and its transepts are smaller than the body of the choir. On this base was raised a central tower, whose plan we present. (39). For a small church the oblong plan lent itself better than the square plan to the placing of the bells; these being in movement required more space in the sense of their swing than in the other.

In the perspective of the central tower of Dormans (40), e except a base taken in the height of the roof, there is only one completely open story. The crowning of this tower consists today of four gables of equal height but unequal bases, and of two intersecting roofs with four gargoyles at the bottom of the valleys. But this roof only dates from the 15 th century. We are disposed to believe, that originally the open story w was terminated by gables of unequal height, as shown in our figure and according to certain examples of Romanesque towers of Champagne.

Up to the present we must only indicate the central towers of Norman churches from memory, not that these towers may not have had a great importance, but because as stated at the beginning of this Article, they present an entirely peculiar arrangement, and they are rather lanternr intended to light and give elevation to the centre of the church, than as bell towers properly so-called. Indeed central Norman towers preceding the 13 th century and still existing, like that of S. Georges of Bocherville, the remains of that of the abbey church of Ju-

The elevation of this tower (37) shows its external decoration, a mixture of the Romanesque traditions of the provinces of the West and of the new French architecture of that epoch. As in the West, the angles are still flanked by engaged columns, and the pointed decoration is the only concession to the taste of the time, which is scarcely motived by the construction, still entirely Romanesque. The spire with octagonal base on that square tower is also itself the result of a foreign influence on local traditions, and the transepts rest very unskilfully on the coupled columns of the upper openings. A little stairway, circular at base and octagonal at the top, is detached from the mass of the tower, and ascending from the ground, gives access to the lower story of the belfry.

We give (38) a detail of the openings of that lower story with the holes pierced in the filling slabs. Indeed the great pointed archivolts of the two stories are only a decoration, and play no part in the cons ruction. In making that concession to the new forms, the architect understood that these arches, if they had been built of through stones would have had the effect of pushing outward the angles of the tower, and a adopting a decoration of a character already Gothic, he prudently retained his Romanesque system of construction. It is necessary to point out an advance in the tower of S. Menoux; this is that this tower is very well arranged foh placing a bell cage of carpentry supporting the bells at its top. The timbers are sufficiently ventilated by the openings of the lower windows without risk of being wetted, and the upper s story allows the sound of the bells to pass freely. In most Romanesque towers is very soon recognized a desire to erect a tower, than to satisfy a special need; the towers with octagonal bases, so common in the provinces of the East, lend themselves badly to the placing of wooden bell cages, which can only be inscribed in the square, their permanent stories are likewise opened and do not allow the vibrations of the bells to be developed in their entire intensity; the combination a adopted in the construction of the tower of S. Menoux is better, in that it gives only one story of very open windows, near the pyramid, whose stone concavity is very favorable to the reflection of the vibrations of the bells. Yet in all the preceding towers, no more than in that of S. Menoux, one does

The section of this tower that we give (34) shows at the b base of the stone pyramid traces of wooden ties, a sort of r radial timbers designed to arrest the spreading of the four walls under the weight of the pyramid. It is necessary to note the original arrangement of the clusters of little columns, that separate the twin openings of the belfry story (35). The constructors thus obtained great apparent lightness at the s same time as perfect stability. Examining this tower along t the diagonal of the square, the openings left in these clusters of four little columns occupy all their width, and thus contribute to give elegance and delicacy to the upper story; the twin openings with their open pier form a wide openiug, that does not seem to load the single openings of the lower f faces. This arrangement is again found in certain towers of Auvergne, and it produces the most graceful effect, particularly in square towers, whose angles present to the eye a very solid mass. At Bois S. Marie we find a central tower uith analogous arrangements. In approaching Bourbonnais, the square form given to the central towers still persists toward the end end of the 12 th century, but the antique traditions are lost; very broad innovations appear, although less frank than those introduced in the architecture of Ile-de-France.

In Bourbonnais exists a central tower erected during the f first half of the 13 th century, presenting the most singular mixture of the various influences, that have left traces at t the east and west of that province, with the new system already adopted in Ile-de-France; this is the tower of the church S. Menoux near Souvigny. Like the towers of Saone-et-Loire, the central tower of S. Menoux is square; but its substructure forms a lantern in the interior of the church, like those of the central towers of the Norman churches and those of the Rhine, of the cathedral of Laon and the church Notre Dame of Cluny. (Fig. 36; section of the tower of S. Menoux). Its second story is decorated on the exterior by a very rich blind arcade, and is opened by means of slabs pierced by round holes and quatrefoils; then rises the story opened by arches designed to pass the sound of the bells. Trumpets are arranged to support a stone spire with octagonal base, that still existed at the beginning of this (19 th) century, receive pinnacles on the angles of the square.

and enlarges the very small edifice surmounted by it instead of crushing it. Finally one recognizes there the work of consummate artists, of wise and skilful constructors. A tower of that epoch built on the crossing of a cathedral, and according to such happy proportions, must be a monument of the greatest beauty, unfortunately we do not possess a single one of them on the soil of France. Fires and the hand of man, more than t time, have destroyed them all, and we no longer find on our great religious edifices but the bases of the ruins of such beautiful structures. The cathedral of Coutances alone has r retained its central tower of the 13 th century; yet it is not complete; its stone spire is wanting. As for its style, it belongs to Norman architecture and differs much from the character of French architecture.

Note 1.p.323. These four columns no longer exist; but one s sees their traces on the cornice course. The pinnacles that surmounted it have consequently disappeared, but their arrangement is shown by the eight separated columns and the direction of their capitals.

Only in Ile-de-France and the adjacent provinces does one see the central towers, as well as those facades, suddenly assume a character so determinate from the end of the 12 th century, and abandon the Romanesque traditions. In Champagne, Burgundy, on the banks of the upper Marne, of the Saone, the central towers remain square, and most commonly terminate by pyramids with rectangular bases until the beginning of the 13 th century. The central tower of the church of Chateauneuf, built about the middle of the 12 th century, is an example of this kind of construction. It is composed of a plain substructure of rubble with angles of cut stone, set according to custom on the four piers of the crossing and the four transverse arches; of a story pierced by a single opening on each face; of a belfry with four twin openings, and of a pyramid with a square base built of rubble with four dormers.

Here is the elevation of that central spire (33). One will note the arrangement of the openings of the second story; as in the details of the Romanesque architecture of those provinces, there is a reminiscence of the Gallo-Roman monuments. H Here the angles of the belfry are flanked by pilasters supporting the cornice; this is again a memorial of Roman antiquity.

open story designed for placing the bells, and comes to the p perfect square plan without recessions or projections.

Here (29) is the plan of the story of the belfry. On the c cornice are eight monstrous heads, placed at the angles of t the octagon inscribed in a square, giving rise to the eight h hips of the byramid with octagonal base forming the spire. On the projecting angles of the square four columns four columns 1 bear four pinnacles, that abut against the eight engaged c columns at the base of the spire, separating as they rise. Th These columns are monoliths not forming a part of the construction of the pyramid. Four round-arched openings between the eight columns allow passage from the interior into the pinnacles. On the four faces of the pyramid parallel to the faces of the square, four other openings form great domes surmounted by gables. The plan (30 is taken at the level of the base of the pyramid, and explains the arrangement of the pinnacles and of the dormers. A perspective view (31) gives the entirety of this monument. This construction is light and well reasoned, executed in small materials, and has suffered no notable alteration in its entirety. The courses composing the spire are carved externally in circular scales and imitate tiles. A section is necessary to make understood the simple, bold a and solid construction of this tower. We give it (32). The t trumpets A that bear four faces of the pyramid skilfully rest their springings on the crowns of the arches B of the eight openings of the square story. The internal surfaces of the t tower rise vertically to their meeting with the inclined surfaces of the spire, and from that point this has no more than a thickness of 3 ins.; but four of its faces are reinforced by the summits of the gables C, that fulfil the office of b buttresses. (Art. Construction). Between this charming construction and most of the tolerably heavy buildings previously given, there is an immense step indeed. The proportions of the different parts of the tower of Vernouillet are designed by a true artist, and contrast with the stories divided in equal zones of the towers of the East, with the depressed crownings of those of the West. The details of the mouldings and ornamentation are well executed, refined and firm at the same time, skilfully calculated for the places they occupy; so well that this tower, that is of very small dimensions, appears great

of the church of Poissy is of carpentry, like certain spires of Norman towers in an analogous situation; and there is no reason to suppose, that it was originally projected in stone. The open story of the octagonal belfry is composed of twin arches in the wide and single arches of the small sides. The b base of this tower contains neither a dome nor a lantern, like the central towers of the Rhine or of Normandy, it being merely the lower story of the belfry above the vault of the nave.

We present (28) a perspective view of this tower, whose construction dates from the first years of the 12 th century. S Still from the end of that century men renounced in Ile-de-France octagonal towers for the central towers of churches; the square plans of Norman towers prevailed, the spires alone retained the octagonal form at the base with four pinnacles at the angles.

Not far from Poissy in descending the Seine may be seen on the left bank a little church built at the centre of the village of Vernouillet. That church possesses a tower over the crossing at the entrance of the choir. The construction of t tne tower of Vernouillet dates from the last years of the 12 th century (about 1190); there are no more experiments or uncertainties; the different Romanesque influences from the East and West are fused; a new art formed of these different elements, but frank and original, appears in all its splendor.

Before the construction of the central tower of Vernouillet was erected that of Limay near Mantes, and which already gives a square tower surmounted by a spire with octagonal base, with four solid pinnacles on the angles and dormers on four faces of the pyramid. The tower of Limay is still heavy and subject to Romanesque traditions, but is one of the first steps made in the new path. The central towers of the 12 th century are very rare in that part of France, devastated by the wars of the end of that century; so that of Vernouillet, that closes the epoch of transition, must be studied with care. It is composed of a square base without opening, resting on the four piers of the crossing and on four transverse arches. The open belfry rises on that base; its angles are reinforced by engaged columns forming buttresses; the four faces are each pierced by two openings. A cornice with corbels terminates that

and even in Berry. The tower of the upper church of Loches, built over the sanctuary, not only retains that arrengement of the Perigord towers, but also the angle pinnacles; as for its spire, it is octagonal instead of being conical. But the architects of the 12 th century who erected that tower were skilful constructors, and understood that a single engaged c column at the angle of a square story as at S. Front, did not suffice to resist the thrust of the arches, and that it was necessary to strengthen the angles. They have then removed t the engaged columns from these angles, to leave them greater strength, and thus have brought nearer the double arcades on each face. By this method the thick angles being loaded by p pinnacles load vertically the four lower points of support, and maintain the stability of the tower. From the paint of v view of construction, the central tower of the church of Loches is one of the best designed after the traditions of Perigord, and Fig. 27 presents a perspective of it.

Note 1.p.318. We owe the two last drawings to the courtesy of M. Boeswillwald.

Profiting by the two styles coming from the East and the W west, the architects of the provinces of the royal domain erected on their churches in the 12 th century central towers, that were subject to these two influences, but like all the a architecture of that epoch and territory, soon assumed a special character, which is really the French style. We find a r remarkable example of it at Poissy.in the collegiate church. On the last bay of the nave, at the entrance of the choir (f (for that church is without transepts), rises a tower resting on four piers. Its base is square; at the four angles of the base rise four massive pinnacles (one alone contains a little screw stair); above is palced the base of the belfry with a singular octagonal plan, i.e., having four large and small s sides. Placing the tower on four piers, it is evident that the constructors have not dared to adopt the regular octagon, in order to avoid too great trumpets, and to bring as nearly as possible the entire load on these four points of support. But the angles of the octagon possess their engaged columns, the angles of the square their pinnacles, which recall the w western influence, and the belfry is octagonal, like most of the central towers of the East. The spire of the central tower

parallel to the diagonals of the sqaare are borne on pendentives. The construction of this tower dates back to the end of the 11 th century; it is light with regard to its height.

Here (25) is at C the plan, at D the elevation, and at E t the section on A B of this tower. The nature of the materials employed (red sandstone from the Vosges) permitted the constructor to give the walls of the octagon quite a small thickness (2.6 ft.); again the stones of these walls do not extend through, one notes that the lower story is built of rubble inside and surfaced with cut stone outside. The angles of the prism are loaded by eight stone pinnacles at the base of the spire, and the four breaches covering the pendentives at the base receive on their slopes four little statues, that we think are the four winds or perhaps the four seasons.

The curious church of S. Foi at Schlettstádt likewise possesses a central tower rising over the crossing, that merits being mentioned. Like that of Gebweiler, the tower of S. Foi is octagonal, resting on four transverse arches and on transepts. It consists of a story ornamented by a blind arcade above a substructure, of an open story and a pyramidal stone s spire with slightly convex sides next the cornice.

We give (26) a perspective of this tower, well built of s sandstone. One will note at the angles of each of the two stories the flat ornaments that recall the crowning finish, that we have seen at the base of the spires of towers of Isomes a and of Gebweiler. The tower of Schlettstadt is contemporaneous s with this; it belongs to the end of the 11 th or the beginning of the 12 th century. Little varied in their general composition and in their details, the Rhenish central towers of the Romanesque epoch approach more or less to those two examples.

It is now necessary for us to return to the most derivatives from the tower of S. Front of Perigueux. It has been seen that one of the special characters peculiar to that tower of S. Front consists in certain engaged columns, that separate the a arches like the Roman orders of architecture. One finds this arrangement in many central towers of Angoumois, Saintonge a and Perigord; it is frankly adopted in the tower of Montmoreau, those of Segonzac and of Jaosac; and we have seen it followed even in distant provinces, that however suffer the influence of the architecture of the western coast, as in Poitou

ornament, or in the last time of the Romanesque,period, by octagonal pyramids. Among the towers of the Marne, one of the oldest and most interesting by its perfect preservation is t the tower of the little church of Isomes; it dates from the second half of the 12 th century.

We present (24) its perspective view. The crowning of this tower merits fixing the attention of architects. At the base of the spire, it is composed of four gables and of four pinnacles at the angles with the most picturesque effect. The little platform terminating the four triangular pinnacles were probably designed to receive the figures of the four evangelists, according to a custom quite generally established in Burgundy and in Champagne. Gargoyles simply blocked out receive the water from the spire between the gables and the pinnacles. Our Figure sufficiently proves that this spire rests at base on two lateral walls of the nave without transepts and on two transvers. arches. But if these square central towers have a Carlovingian origin, it must be recognized, that even in the provinces where they originated, the primitive type w was soon modified, for nearly all the central towers on the banks of the Rhine in the 11 th and 12 th centuries are built on an octagonal plan, as we have said above. Yet one cannot ignore that influence, if not in the entirety of the plan, at least in the details. The pinnacles at the angles, the arrangement of the openings, the decorations of the bands and of the capitals of the upper Marne and the upper Saone are evidently borrowed from the primitive Carlovingian style. Only the constructurs of these last provinces, less skilful and l less knowing than those of the Rhine, probably dared not place an octagon on four piers. If the architect who built the church of Germigny believed in good faith, that he copied the c construction of the church of Aix-la-Chapelle, one can indeed admit that the architect of the tower of Isomes was inspired by Rhenish structures; only he dared to adopt the octagonal plan for the spire. It is necessary for us to study some of the central towers of the Rhenish provinces to cause the recognition of the influence, that they must have exerted on the structures of the French provinces of the East.

There exists an the crossing of the church of Gebweiler a c central tower, octagonal from its base, whose four faces par-

cannot give that little edifice the honor of having served as a type), Carlovingian towers by origin, influenced structures undertaken on the banks of the Saone, the upper Marne and in Lyonnais. One of the oldest central towers of the last province is that of the church of Ainay at Lyons. The massive base of that tower probably dates from the 11 th century, and its open upper story from the 12 th. If one considers the lower part of the central tower of Ainay, it might be supposed that it was destined to bear several stories, for its massive walls are only pierced by a little opening on each face, and have a considerable resistance. Yet this base was only surmounted by a single story pierced by arcades. Yet it is not rare in old Lyonnais to meet with these stumpy towers, covered by a f flat roof in carpentry, protected by Roman tiles originally, later by hollow tiles.

Fig. 23 represents a view of the central tower of Ainay. I Its base is built of rubble with angles of cut stone, it rests on four transverse arches and contains a dome; the massive p polygonal stairway leads to the upper story, which is of stone and later than the base. The cornice terminating that story forms the projection supported by corbels, not permitting the supposition of an intention to construct more than one story on the high base above the vaults of the church.

Toward the upper Marne and the upper Saone, i.e., in approaching the Rhine, the central towers of churches do not have that crushed form, and are covered by stone spires; yet they long retain the square plan up to the crowning cornice, the stone spire is frequently octagonal in plan, and the angles remaining between the sides of the polygon and the square are filled by terminations of stone in the form of projections d detached from the pyramid of the spire. The presence of these projections of triangular pinnaclesis motived by the construction of the spire of stone, whose four faces rest on corbellings or pendentives, the load of the pinnacles being intended to prevent the overhang of the corbelling or pendentives. In these provinces the structures of the 11 th century and the beginning of the 12 th are rude and the towers are of remarkable simplicity; closed on the western side because of the r rainy winds, they are pierced only by quite narrow round arches on three sides and surmounted by square spires without any

the construction of sacred edifices like the church of Aix-la-Chapelle, which are built on circular or polygonal plans, strengthened by niches in imitation of certain oriental edifices of the first Christian times, the resistance of these structures, preferably abutted at all points, and even their form, necessarily led to an elevated central crowning part.

We possess on the banks of the Loire at Germigny-des-Pres near Sully, a little church of the greatest interest, for its date and history are known. "The monk Letalde, a writer of the 10 th century states," says M. Merimee,[1] "that Theodulphe, at first abbot of S. Benoit-sur-Loire, then bishop of Orleans, caused the building of the church of Germigny in imitation of that of Aix-la-Chapelle." It must be confessed that the imitation is very free, for what exists of the plan of Theodulphe, i.e., the principal part of the edifice, gives four square piers surrounded by a side aisle with three little apses, one at the east and two at the south and north. This plan much more recalls the little Greek churches of Asia and of the Peloponnessus than that of Aix-la-Chapelle. However that may be, on the four central piers rises a square tower resting on four transverse arches. Its belfry is only separated from the church by a floor, and on each of its four faces it is o pierced in the lower story forming a lantern, by four little windows decorated by stucco inside; in the upper story intended for the bells, by four twin windows. One finds in the stucco and in the construction itself, made of rubble covered by plaster and mosaic beneath the vault of the eastern apse, traditions of the late empire.

But we shall have occasion to return to this curious monument in Art. Eglise. We must here limit ourselves to mentioning it, because its date and the presence of the central tower earlier than that of S. Front at Perigueux, since it was erected at the beginning of the 9 th century. Then until the present, one can find two distinct origins for the introduction of the central towers into France; one by the Venetians on the western coast; the other by the carlovingian renaissance of the east. There are provinces where these two influences meet and mingle; others where they dominate separately. Now if the tower of S. Front served as a type for a great number of churches in the West, towers analogous to that of Germigny (for we

passage of bells. Those were of sufficiently small dimensions to be introduced through openings of the tower, or which is more probable, were raised before closing the lower vaults.

Note 2.p.310. The tower of the church of Cognat, which much resembles that of the church of Obazine, and which is older, has retained its stone spire with octagonal base. It is engraved in the Revue d'Architecture of M. Cesar Daly. Vol. 12. Nos. 3, 4, 5 and 6.

We shall have occasion to present a certain number of these towers of that epoch of transition of Gothic in Art. Eglise, to which we refer our readers.

Normandy of all French provinces was the one that longest persisted in erecting colossal towers over the crossings of its churches. The cathedrals of Bayeux, Coutances, Rouen, the chucches of the Trinite of Caen, of S. Ouen of Rouen, still posses central towers, that date from the 12 th, 13 th, 14 th 15 th and 16 th centuries. While in Ile-de-France, Picardy a and Champagne were renounced from the end of the 13 th century the placing of stone towers over the crossings of churches. The cathedral of Paris never possessed but a wooden spire at the intersection of the transverse aisle, which dated from the beginning of the 13 th century; the cathedrals of Amiens and Beauvais were surmounted by central towers of stone and wood; but these structures hawing fallen or been destroyed by fire were replaced only by spires of carpentry covered by lead. The provinces of the East during the Romanesque period erected central towers of stone on a great number of their churches; these were square on the upper Saone, upper Marne and upper Rhone; octagonal toward the end of the 11 th centurw in approaching the Rhine.

It appears that the custom of towers placed over the centre of the crossings of churches was very early adopted in the provinces particularly subject to the Carlovingian influence or that of the renaissance of the arts of the late empire. One conceives indeed, that it was difficult to place a tower over the c crossing of a Latin basilica; the small thickness of the walls of these monuments, the width of the naves and the weakness of the points of support of the body of the church, scarcely allowed the loading of such light structures with masonry rising to a very great height. But when Charlemagne had caused

with eight sides. Such were the recently restored [2] central towers of the churches of Issoire, Notre Dame-du-Port at Clermont, S. Nectaire, built during the second half of the 11 th century. But these towers rest on a substructure belonging e exclusively to Auvergne, and comprising the dome and two half domes abutting it in the direction of the transepts; (Arts.A Architecture Religieuse, Construction, Eglise); this construction consists in placing a tower with octagonal base on an e enormous rectangular structure, and is not happy, for there is no transition from the substructure belonging to the church to the tower. The eye does not suspect the dome on the exterior, and cannot understand how a prismatic tower rests on a rectangle.

Note 2. p.307. By M. Malloy, architect. These towers have been destroyed.

On the contrary, we find these transitions skilfully managed in the central tower of the little church of Obazine. The dome of the crossing at Obazine is entirely that of Perigord, resting on four transverse arches and pendentives; on the dome r rises an open octagonal tower. We give (21) the elevation of that tower.[1] It is evident how the pendentives of the dome a are covered by sloping triangles, and how from the square base resting on the four piers and the transverse arches the s structure attains the perfect octagon. The section (22) indicates the entirety of this structure.

Note 1.p.310. The stone spire no longer exists and has been replaced by a carpentry roof.

This system was derived from the school of Perigueux and p prevailed in Languedoc until the end of the 13 th century, and the great central tower of S. Sernin of Toulouse, built of s stone and brick about the middle of the 13 th century, was s still constructed according to that principle. We also find octagonal central towers of the transition epoch in the provinces of the Centre, in the church of Cogniat, for example,[2] and even in Burgundy. The beautiful church of Paray-le-Monial still possesses an octagonal central spire, whose lower story dates from the end of the 12 th century and the upper story from the 13 th. This tower has 32.8 ft. in width outside and surmounts an octagonal dome pierced by an opening for passage of the bells. On this it is useful to note, that in the lower vaults of the primitive towers no openings are left for pass-

Perigueux is the first known type, is perpetuated and perfected in the 12 th century in the provinces o the West. Many c churches of Angoumois and Saintonge still possess central towers well conceived, well constructed, and take more slender forms as they approach the end of that century. Among several, we shall select one, which from base to apex is so combined as to present perfect stability; this is the tower of the church of Roulet. That church like most of the religious edifices of the second order in that province, is composed of a s single aisle covered by domes. At the entrance of the choir is a bay thicker in its lower parts, which bears the tower. Here (16) is the plan of the bay in the ground story supporting the tower, that rises from the ground on the two side walls and the two transverse arches turned over the four piers. Above the roof is a square substructure decorated by blind a arcades, then a story likewise square but pierced by open arcades; that is the story intended for the bells. On the last story rises the frankly conceived spire, no longer convex.

Here (17) is the plan of the square story of the belfry, a and (18) the plan of the base of the cone with its four little pinnacles. Fig. 19 gives the section of this tower, and Fig. 20 is its elevation.[1] These sketches show, that already about the middle of the 12 th century western architects were occupied in giving more elegance to their towers, the square stories have happy proportions, the conical spires are more s slender and are covered by angular inverted circular scales, but always retainiug the principle of construction presented by Fig. 15; the angle pinnacles are open and assume more importance. They are set diagonally so as to profit by a wider base. Until the end of the 12 th century this form of tower persists, daily becoming lighter. But what characterizes these towers in the West is there square stories, that rise from the bottom, from the base to the spire, and particularly that conical covering uhose scales are finer as Romanesque art arrives at its final degree of elegance.

Note 1.p.307. We owe these drawings, like those of Brantome, to M. Abadie, architect of S. Front.

In Auvergne from the 11 th century the central towers rest on a dome inscribed in the square, and abruptly come to an o octagonla plan with two or three stories crowned by a pyramid

most abutted in those monuments, by preference built their towers at the intersection of the transverse aisle, at the entrance to the choir, on the last reinforced bay of the nave.

There still exists a great tower of the end of the 11 th c century on the church of abbey de Dames at Saintes, which still recalling the primitive arrangement of the tower of S. F Front, is already frankly Romanesque, and abandons the antique forms characterizing the tower of Perigueux.

We give (14) a view of this tower. Above the vaults of the church it is composed of a square story pierced on each side by three arches supported by piers formed of engaged columns. As at S. Front, a hemispherical vault bears a circular story, no longer composed of a close row of columns, but of 12 small cylindrical buttresses, between which open arches divided by one column. That story is surmoun ed by a slightly conical c cap, covered by inverted scales, like that of S. Front. But here the architect, more skilful than that of the tower of P Perigueux, has already understood that he must load the four angles of the square base by pinnacles, to give greater resistance to these angles.

It may seem strange that he decorated the stone courses by inverted scales, for at first it would seem more proper to p place the scales in their natural sense like tiles, so as to facilitate the removal of the rainwater; but when one examines closely the construction of these stone courses, he understands perfectly why the builders adopted this singular arrangement. It is because each space between the scales forms a little gutter removing the water from the vertical joints. A figure is necessary to explain this system of covering in stone. Let (15) be a perspective detail of a portion of the scaly cone of a section; the beds of the courses being at A and the vertical joints at B. Water always following the surfaces is naturally conducted from a surface C over the lower surface D, and thus is not led to penetrate the vertical joints, which are the more secure because they are found at the highest point E of the scales and intersecting their vertical surface F. Aud indeed these cones covered by inverted scales better resist the effect of rain than cones or pyramids with smooth surfaces.

The form of the towers of which the church of S. Front of

right in principle. Besides the Romanesque architects did not generally give to the towers of facades the importance since given to them. For them the principal tower, that rising highest and having the widest base was naturally the tower erected over the crossing. That base was determined by the distance between the piers, by the width of the nave, and starting from a plan so extended in area, it was indeed necessary to raise its summit to a great height, so as to give suitable proportions to the tower.

Unfortunately of the great Norman towers erected over the crossings before the end of the 12 th century, there remain to us only fragments, traces buried in later constructions, or at most the lower stories.[1] These towers were square, pierced by one or two stories of windows lighting the interior of the church. Properly speaking, the tower only commenced above these stories, which participated with the interior of the c church.

Note 1.p.304. There is still to be seen above the vault of the crossing of the cathedral of Bayeux the stump of the bell tower, from the beginning of the 12 th century, buried in the structure of the 13 th, which indicates that this primitive tower had the same base as the present one, rebuilt at different times.

We shall first occupy ourselves with these central towers, and that appear to have been adopted in France about the beginning of the 11 th century in the provinces of the Centre, the East, and in Normandy. We have given in Fig. 1 the tower of the cathedral of Perigueux, which dates from the end of t the 10 th or the beginning of the 11 th centuries. As we have stated, this structure had an influence on most of those erected in the 11 th and 12 th centuries in Perigord, Saintonge, Angoumois and Poitou. But the imitators avoided the defects i in construction noted in this tower, and that required the c closing of nearly all its openings; on the contrary, they sought to give their towers great stability by means of strong angles of masonry and ingenious combinations. The architects of those provinces, either influenced by the position assigned to the tower of S. Front of Perigueux, built astride the old Latin church, or that they had recognized that the centre of the crossing of churches as the most resistant point and that

cities of the North, the awakening of the municipal spirit is marked by the erection of great bell towers attached to the cathedral churches, for it is necessary to observe that the t towers most imposing by their height and their richness rose at the end of the 11 th and during the 12 th centuries in the midst of cities erected into communes by permission or force.

But no province rivals Normandy from the end of the 11 th century in the number and dimensions of its towers. The Normans established on the continent soon became indefatigable constructors. They first had wealth, then a spirit of continuance lacking to most French peoples; these two conditions w were equally necessary to erect extensive monuments requiring lengthy labors. Well provided with materials for building, t the Normans after the time of William the Conqueror erected vast churches and crowned them by numerous and tall towers; particularly during the 12 th century their cities distinguished themselves among French cities by the number and prodigous height of the towers. The most of their churches, even of the second order, possessed three, a tower over the crossing and two on the facade. Their cathedrals and abbey churches soon had five, for to the theee witn places just indicated w were often added two of less importance flanking the sanctuary over the side aisles. It was only at the end of the 12 th century, that the provinces of the rolay domain even went beyond the Norman structures by giving their cathedrals seven a and even nine towers. (Art. Cathedrale).

The central Norman tower placed at the crossing of the transverse aisle is not only the tower rising above the vaults of the church and restiig on the four main piers, but it also contributes to the internal effect of the monument by leaving over the crossing a vast lantern, open and visible in the interior, whose effect adds strikingly to the grandeur of the nave. As for the towers annexed to the facade, the oldest rise from the ground, and the interval left between them is reserved for the porch or vestibule. That method applied to the c construction of the towers of facades was not properly above that of Normandy, before the Gothic period. Romanesque constructors would not have dared like their successors, to place those colossal towers partly on the front and lateral walls, partly on an isolated pier, and it must be said that they were

question of economy, the more because one finds everywhere in the church of S. Front the evidence of a penury of resources, the desire to erect a vast monument while spending the least possible.

It is probable that in the first centuries of the middle ages, there were built beside very old churches, but outside their plans, towers to which it was desired to give great height and consequently a stable and broad base. From the 11 th century, what characterizes the tower of the church and distinguishes it from the towers of castles or of private houses are:-- 1, those open upper stories destined to receive the bells, 2, the pointed pyramidal stone upper portion serving as a roof. The primitive towers in France taking the square f form of plan, the stone pyramids crowning them have square b bases themselves, with or without ribs on the hips. Yet there are exceptions to this rule, and the old tower of Perigueux is the proof of this; there the cap borne by a circular story is conical; but it must be recognized, as we have already stated, a foreign origin in the tower of Perigueux, which served as a type for many towers in the West, for we see those conical caps persist in that part of France during the 12 th century, and even penetrate into Berry. Outside that influence f from Perigueux, whose origin may be Byzantine, and outside t the western school of which Brantome is a type, the provinces composing the France of our days adopt bell towers for their churches, large or small, after the 11 th century; but all do not adopt the same arrangements, either for the location or the form given to the towers. Some, like Auvergne and the Centre, that were in advance of the North and West during the R Romanesque period, first place their towers over the intersection of the transepts and nave, on the crossing or the facade; the others as in the provinces, place them before the naves and in the angler of the transepts. Finally others hesitate as in the most southern provinces, and do not include the t towers in the general plan of the church, or give them a minimum importance. Perhaps in countries where the municipal spirit of the Roman cities was preserved as in Italy, there existed near the churches isolated towers both religious and c communal, that were destroyed at the time of the religious wars of the 13 th century; what is certain is that in the ci-

lords, and as such must place watchmen at the tops of the towers of churches, just as the lan lords did on the tops of the keeps of their castles. These watchmen by day and night were charged to signal to the inhabitants of the cities by ringing bells or blowing horns, fires, storms, approach of the enemy, rising of the sun, opening and closing of the portals of the cathedral aud of the cloisters.

We gave (13) the elevation of the tower of the cathedral of Puy.

It is certain that the architects who erected the oldest t towers sought to crown them by surprising arrangements of a nature to excite admiration or astonishment. To place the bells did not rejuire labored combinations; it was first of all desired to attract the attention of the people by erecting b beside the church or on its lower structure, a monument seen afar, and that by its form should contrast with the towers of castles or palaces, while rivalling them in height.

From the 11 th century the towers of cathedral churches often served as belfries for the cities (Art. Beffroi), and the city was also interested like the chapter in marking its wealth and power by bold structures dominating private houses and public monuments.

The bell tower of the cathedral of Puy is joined to the body of the edifice, but is not palced on a porch or the crossing of the church; it is a monument nearly independent of the plan, an annex as at Brantome. That arrangement is only found in v very old churches.

Everyone knows that in Italy the towers of churches are all isolated, and that they form a detached monument. But in Italy during the first centuries of the middle ages, the cities had retained their Roman constructions or nearly so, and the bell tower was a municipal as much as a religious monument. In the South of France, the lodest towers present the same a arrangement and do not form a part of the plan of the church. The tower of Perigueux itself is placed on a retained portion of the primitive church, but is not attached to the abbey church of the end of the 10 th century. The constructors in Perigord desired to utilize the old structure, that served as a substructure and allowed them to raise to a great height their new tower without too much expense. There is certainly a ques-

century. As for the upper portion, it no longer exists; but e everything leads one to believe, that it receded so as to re-st on the four columns. A tower of a more recent epoch (end of the 11 th century), that of the cathedral of Puy-en-Velay,[1] gives us the same arrangement in its entirety. This tower is composed at base of a square enclosing wall with four detached piers in the interior. Arches are turned from these piers to the walls and support tunnel vaults perpendicular to the four walls; on these vaults rest the upper stories, that recede u until vertically over the piers; thus the **summit** of this tow-er rests on the piers.

Note 1.p.299. Although Puy-en-Velay is not comprised in the western provinces, yet at that epoch in the 1_ th century, t there existed frequent and continued relations between Auver-gne and Limousin.

We give (8) the section of this tower, (9) the plan at the level A of the first story,(10) the plan at the level B of t the second story, (11) the plan at the level C of the third story, and (12) the plan at the level D of the upper story.[1] The last plan, as may be verified, is exactly superposed on the lower piers. One will note the singular arrangement of p plan in Fig. 11, which presents a series of internal and ex-ternal niches intersecting with much skill so as to transfer the loads to the angles of the tower.

Note 1.p.300. These plans are at a scale of 1 \ 200. We owe them to the courtesy of M. Mallory, former architect of the cathedral of Puy.

But already in the 11 th century Auvergne possessed constr-uctors with rare skill and much more skilful than those of the other provinces of France. (Art. Construction). The tower of the cathedral of Puy-en-Velay, whatever its importance and the dimensions of its structure, still could have only quite small bells, as shown by its section in Fig. 8, and certainly those that erected it thought as much of building a high tower, a monument suited to be seen afar, to indicate the church, than to receive the bells, for they could have secured the latter result at much le s cost. In examining the section, it is ea-sy to recognize that the part of the tower intended for bells is comprised between the **levels** B and C, while the last story is much rather the room for a watchman than a belfry. Bishops

light carpentry is built, that is merely a centering, properly speaking, and on this form are set courses of rubble corbelled inside from base to vertex. The construction being completed, the internal centering may be removed. This is evidently a v very ancient tradition.

After the construction of the tower of S. Leonard was erected at Uzerches a tower-porch, that still retains the principal characteristics of the tower of Brantome; but the upper story, although octagonal, presents its facades parallel to those of the square base. The angles remaining free between the square plan of the octagonal plan are covered by stone projections taking the place of pinnacles. We give (6 bis) a view of the tower of Uzerches. It is built of granite, and t the diagonal faces of the octagonal story are borne by internal corbels. The bell cage of carpentry rests on a domical vault with octagonal base, pierced at top by an opening for the passame of the bells; the pyramid was formerly constructed of rubble, but has been replaced by carpentry. In spite of its Romanesque appearance, this tower dates from the last years of the 12 th century, and it shows that if the provinces of Aquitaine had rapidly perfected Romanesque arts, they were n not disposed at the end of the 12 th century to free themselves from these, like the provinces of the North. Yet the two schools of Perigord, that of S. Front that we have traced at Brantome and then at S. Leonard, Uzerches and in many churches of Limousin, present a third variety meriting mention, from t the point of view of construction if not appearance. Preoccupied by the idea of superposing in the construction of towers stories receding behind each other, the architects of Limousin did not always seek to obtain this result, either by dangerous overhangs as at S. Front of Perigueux, or by corbelling as at Brantome and Uzerches; they have sometimes attempted a different method.

About the middle of the 11 th century was erected before the cathedral of Limoges (for that is the location of most of the towers of that epoch), a great tower, whose lower plan presents the arrangement indicated here.(7). The four internal columns A were thus destined to support from the bottom the successive recessions of the stories of the tower. The three lower stories alone are retained and enclosed in a structure of the 13 th

dome. In the tower of Brantome all indicates a Latin origin; the system of construction, jointing, form of the arches; it is complete and developed from the point of view of construction. There is even in the proportions of this structure a certain research appertaining to consummate artists; the voidsl projections and solids are skilfully distributed. The rudeness of the lower portion recalls Roman structures, is allied by h happy transitions to the upper arrangement. This school is f foreign and superior to that of Perigueux and should not stop in such a fine course; we see it develop in the most complete manner in the construction of the tower of S. Leonard, almost contemporaneous with that of Brantomi. Retaining the system adopted in the lower stories of the tower of Brantome, the a architect of the tower of S. Leonard undertook to erect an o octagonal belfry by taking the points of support as the four angles of the square tower and the four apexes of the gables crossing the arches pierced at the base of this belfry, so as to present four angles of its octagon at the midst of the four sides of the square. (See Fig. 6, the perspective of this tower). That was a system entirely novel and original, frank and perfectly substantial, for the angles of the octagon so placed rested more directly on the resistant parts of the construction, than if this octagon had been placed with its sides parallel to the sides of the square. This study and research in the construction appear in the execution of the details and in the proportions of this beautiful monument. The architect has given grandeur to the principal divisions of h his tower by placing rows of blind arcades at A on the base and at B at the top. In this remarkable work are all the qualities, that one is pleased to recognize in good antique Roman architecture, and further a certain refinement, an instinct for proportions, that belongs to this school of architects of our western provinces. A century and a half later, this system of construction of towers was again applied at Limoges; but it must be lost in the 14 th century, to never reappear after the invasion of the arts of the North in these provinces. As at Brantome, the spire of the tower of S. Leonard is built of rubble.

Note 1.p.284. Even in our days in Vienne, Dordogne and Correze, private houses are covered in the same manner; very li-

of the Roman decadence under the Merovingians? We cannot decide the question. The monuments remaining to us, being evidently only derivations from preceding edifices, we must take them as they are, without attempting to indicate from whence they come.

There exists at the side of the abbey of Brantome,not far f from Perigueux, a great tower built on the rock beside and without communication with it. It is an isolated tower; to extend it more above the roofs of the church, the constructors profited by the steep cliff, rising about 40 ft. above the p pavement of the nave. The lower story of the tower of Brantome before the closing of five of its arches once formed a great hall with one side a great wall against the rock, opening on three sides by six deep arches. An elliptical vault covered that hall, whose construction is very singular and quite skilful. Here (2) is the plan of that ground story. Above is a se- second hall closed in the same way at the north side by the great wall containing stairs in a straight flight, and lighted on the three other sides by arches separated by columns. (See plan of this second story, Fig. 3). This hall was not vaulted, but received a floor, that evidently supported the bell cage in carpentry. We give (4) the section of the tower of Brantome on the line A B of the two plans above. This section indicates a skilful and well calculated construction, in which the receding upper stories are skilfully supported by the inclination of the internal surfaces of the story C containiug the beginning of the bell cage. To streugthen the faces of the upper stories of the tower, that are quite thin, great solid gables surmount the arches D and with small buttresses reinforce the angles. The elevation (5) makes this arrangement intelligible. The plan of this tower is not a perfect square, but is oblong in order to leave free movement of the bells. According to a very ancient custom, that belongs to Quercy, and that we have seen adopted today in private structures, the pyramid with square base crowning the tower is built of small rubble, although the tower is entirely constructed of stone cut and bonded.[1] In the construction of the t tower of Brantome, erected about the middle of the 11 th century, nothing recalls the forms and mode of building employed in the tower of Perigueux, unless this be the little lower d

crowned the upper story by a hemispherical vault surmounted always by an overhanging nearly conical cap borne on a row of isolated columns taken from Roman monuments, and all of d different heights and diameters. It is true that to diminish the dangers resulting from the thrust of the upper dome on t the angle piers, the arcades of the upper story were simply closed by segmental lintels instead of archivolts; but these lintels must break under the load, and just this occurred. What can amaze one is that such a tower could have remained standing. It is necessary to believe, that in the thickness of the masonry between the rows of arches were set horizontal ties of wood, according to the habits of Western constructors, and that these ties maintain the construction. However that may be, a little time after the completion of the tower of S. Front, the arches that we have represented void according to the original plan, were partly lined inside by jambs and archivolts, that considerably diminished the original openings, and the rectangular windows at the base were entirely walled up. Already in the construction of this primitive tower is felt the influence of that bold spirit of the western architects, who a century lateh were to produce, based on knowledge and experience, monuments surprising by their height, lightness and stability. It is difficult to recognize today to what point the tower of S. Front of Periguex served as type for t the architects in the provinces of the West; that it exerted an influence on a great number of their constructions is a f fact not doubtful; but we shall find in towers later than it by about half a century, elements coming from other sources. What characterizes the tower of S. Front is the square receded stories reinforced by engaged columns, between which open small arched openings, and particularly that conical crowning cap borne on a drum formed of columns. We shall find a great number of conical crownings in the West and even to the Loire, on the towers of the 11 th and 12 th centuries, as well as t the square towers with their engaged columns, whose capitals support cornices. But parallel to that family of Perigord towers perhaps imported by the Venetians, we see arise another, whose origin we shall have great difficulty in recognizing, the primitive types no longer existing. Were these types Latin? Or which is probable, did they belong to the last remains

West, the Venetians had caused the penetration of the arts, they had themselves gathered in the East,[4] there occurred an actual revolution in the art of building, one that extended from Perigord and Limousin even to the Loire and into Poitou. Even at Perigueux we find an immense tower, which is no less interesting to study because of the late date of its construction (first years of the 11 th century), than for its singular form and the boldness of its construction. The constructors of S. Front of Perigueux, after erecting the existing church on the model of that of S. Mark of Venice, built on the ruins of the Latin church of the 6 th or 7 th century a square tower terminated by a conical dome borne on columns. Whether this tower was copied more or less faithfully from the old campanile of S. Mark of Venice, or it was composed on unknown data by the Perigord architects of the 12 th century, it always p presents arrangements novel for that epoch, foreign to the R Roman traditions for the entirety, if not for the details. T That tower is very high, and yet it exhibits the greatest inexperience in that kind of construction.

Note 1.p.288. Such are the bases of the towers of Creteil near Paris, of S. Germain-des-Pres, of S. Savin in Poitou, a and of Poissy. (Art. Porche).

Note 2.p.288. Creteil. Recent excavations caused the disappearance of portions, perhaps unique, of that curious structure of the 11 th century. M. Batoueille, architect, had the kindness to draw them for us, and we have occasion to return to them in Art. Porche.

Note 3.p.288. Creteil, S. Savin.

Note 4.p.288. See Art. Architecture, also L"Architecture B Byzantine en France, by M. de Verneilh.

We give its elevations (1) above the Latin structure on w which it is placed. The architects of the tower of S. Front evidently found nothing better than to superpose two square stories, receding one behind the other and thus producing the most dangerous overhang possible to imagine; for the internal surfaces of the walls of the upper square story overhang the surfaces of the lower story, so that the angle piers partly rest on the voussoirs of the small lower arches, and cause t them to tend to push the piers outwards. Not stopping with t that first and so vicious arrangement, these architects crow-

the erection of a tower became a question of pride for the m monasteries, chapters or communes, it was for them who built the highest, richest and most imposing tower. Soon they were not satisfied with a single tower; churches had two, five seven or up to nine, and it is chiefly in the provinces in which secular feudalism erected its most formidable castles, that cathedrals, abbeys and later the parish churches constructed magnificent and numerous towers.

The Roman basilica long served as a type for Christian architects in building their churches, and they commenced to vary from it only about the beginning of the 11 th century in some provinces into which the arts of the East abruptly penetrated; in Perigord and Limousin. When the towers were attached to the imitative basilicas, traditionally antique monuments, the architects were forced to adopt for their towers new forms, since the antique basilaca had nothing to serve as model for that kind of structure.

The idea of erecting instead of the narthex a massive tower suitable for the defense of the entrance to the monument must be more natural, and as we have stated above, that was adopted. That Carlovingian constructors were first of all occupied with the erection of a defense surmounted by a watch-tower and a sonorous alarm, not thinking at all at first of decorating t their towers. Thick walls flanked at the angles by flat buttresses, pierced at the base by a round arch, by rare windows in the stories, and crowned by battlements, a lodge and a belfry, must compose our old towers. The ground story being covered by a round tunnel vault, usually on an oblong plan,[1] served as a porch. Rarely a stair directly communicated from base to summit of the monument, to make more difficult the taking of that defense. The upper stories were only reached by the roofs of the nave or by a doorway opened in the interior of the church at some yards above the pavement, and using a ladder.[2] From the point of view of art, these structures had nothing remarkable. They must be actual structures erected to satisfy the need of the moment. Yet the porch, the lower part of the edifice preceding the entrance, sometimes assumed arrangements already very far-fetched.[3] Primitive Romanesque architecture was poor in invention; always when not based on a Roman tradition, it was singularly sterile. But when in the

the provinces particularly ravaged by the periodical invasions of the Normans, we see the abbey churches and even parist churches preceded by massive towers, of which unfortunately there now remain only the lower stories.

The abbey church of S. Germain-des-Pres at Paris still retains the lower parts of the Carlovingian tower built before it the principal portal, by which the faithful entered. The churches of Poissy and of Creteil on the Seine, and the abbey ch churches of S. Martin of Tours and of S. Savin in Poitou, present the same arrangement of a massive tower preceding the e entrance or serving as a porch. What was at first required by necessity soon became a consecrated arrangement; each church desired to have its tower; further one should not lose sight of the social state of the West in the 11 th century. At that epoch feudalism was established; it erected fortified castles on its domains; these castles all possessed a keep, a tower higher than the rest of the buildings and commanding the outside. Now the cathedral and abbey churches were in possession of the same rights as the lay nobles, they adopted the same visible signs, and desired to have religious keeps, just as the castles had their military keeps. One cannot admit that the enormous bell towers preceding the abbey churches of the 11 th century, as for example those, whose lower stories are yet to be seen at S. Benoit-sur-Loire and at Moissac among o others, were solely destined to receive bells at their summits; for it would be necessary to assume that these bells w were very large or in prodigious number; these two suppositions are alike inadmissible; bells in the 11 th century were small and scarce. Then we regard a bell of 6600 lbs. as an o object of luxury, that few churches could allow themselves. (Art. Cloche).

If the bell tower in the 11 th century had been only a belfry, why would the constructors have employed the greater part of their resources in erecting them, while often obliged to use the greatest economy in the construction of the churches? To suspend a few little bells at the disposal of the religious monument in that epoch, there sufficed a turret set on the gable; it is then necessary to see in the primitive tower a mark of the feudal power of cathedrals and abbeys, or of t the wealth and importance of communes. From the moment that

was very ancient; formerly men were probably satisfied for t the clapper to strike the lower edeg, or to toll it by drawing the clapper to the side of the bell. The extreme narrowness of many old bell towers did not permit ringing the bells of medium size by swinging; and as far as one can judge, the arrangement of the oldest belfries is such, that they could n not have resisted the effect of the bell describing a semicircle. Today has been perefcted the suspension of bells so as to nearly nullify the effect of swinging. (Art. Beffroi).

CLOCHER. Bell Tower. Tower.

Churches built during the first centuries of Christianity possesses no bells and were naturally without bell towers. If already in the 8 th century the use of bells designed to sound at the offices or to assemble the faithful had spread, these bells were not sufficiently of great dimensions to require t the erection of considerable towers, and these bells being s suspended in little campaniles erected beside the church, on the roof, in arches arranged at the apexes of gables, or even in little belfries of wood built on the facade or the side w walls. We do not see that great bells were cast before the 12 th century; again these bells were small compared to those m made during the following centuries, and still the 11 th and 12 th centuries erected bell towers nowise inferior in diameter or height to those built after the 13 th century. One may regard then the oldest bell towers as being monuments intended to cause the church to be recognized afar, as a sign of p power, as much as towers built to contain bells. Motives foreign to the religious ideas must have contributed to cause t the erection of towers adjoining churches.

During the Norman invasions on the coasts of the North, the West, and along the banks of the Loire and the Seine, most of the churches were sacked by those barbarians; men must have thought to protect them from pillage by enclosing them within walls, and by strengthening them by strong towers that defended their approaches. These towers naturally must have been built over the portal of the church, as being the part most attacked. In that case the location of the bells was merely accessory; they were suspended from the summit of these towers, in the loggias of roofs that crowned them. Indeed in

a great part. But from the 15 th century in particular were given to bells considerable dimensions and weights. The first great bell of the cathedral of Paris was cast in 1400 by Jean de Montaigu, brother of Gerard de Montaigu 95 th bishop of Paris; it was named Jacqueline from the name of Jean's wife. It is said to have weighed 16,750 lbs.[1] A second great bell was given to the church of Paris in 1472; it weighed 28,000 lbs. The celebrated bell of Rouen given by cardinal d'Amboise and cast in 1501 weighed 40,600 lbs. It was cracked in 1786 and was not recast.

Note 1.p.285. The weights of great bells have nearly always been exaggerated, and the inscriptions mentioning these on t their surfaces are frequently erroneous. Thus the present great bell of Notre Dame, which passes for weighing more than 38,750 lbs, really weighs only 28,600 lbs.

One of the oldest bells that has been preserved is that of the cathedral of Rheims; it was cast in 1570 and weighs 25,700 lbs. There still exist bells of medium size in the cathedrals of Amiens, Beauvais, Sens, Metz, Chartres, the old cathedral of Carcassonne, in the churches of Soumanes, Notre Dame de Bon Secours at Orleans, Trumilly, etc., in the belfries and cities of Valenciennes, Bethune and Compiegne.

From the 16 th century, bells are decorated by ornamental fillets, scrolls, fleurs-de-lis, heraldic shields, little reliefs representing the crucifixion of Our Lord, with the Holy Virgin and S. John, Jesus lowered from the cross into the arms of his mother, seals of chapters, abbeys, churches and givers; it must be stated that the more they approach the 17 th century, the less clean is the casting of the bells.

Inscriptions formed in the mould for each bell during the 13 th and 14 th centuries, as shown by Fig. 2, are made after t the end of the 15 th century by means of craracters of lead or wood serving to impress each letter on a little plate of wax, that is applied to the model before forming the mould; because of this procedure, the letters are each found inscribed separately in a little tablet more or less decorated, as indicated by Fig. 3, copied from the inscription on one of the bells of the city of Carcassonne, cast about the middle of the 16 th century.

We do not think that the custom of ringing bells by swinging

inspire them to do well," the canons presented them with herrings, carps and other things; M. J. de la Hacte, merchant, a also gave them 10 pints of wine. The vicars of the church visited the workmen, chanted Te Deum, and were present at the blessing of the bells." [1]

Note 1.p.283. Comptes de l'oeuvre de l'eglise de Troyes.

The oldest cast beel seem by us is that still found in 18 5 in the abbey church of Moissac. It was very beautiful, an admirable casting, not retouched by the graver, and with full sound. The form was sufficiently remarkable, that we believe its profile should be given very accurately (1),[2] at a scale of 1 : 20.

Note 2.p.2 3. The bell of Moissac cracked the same year; 1845; it was recast, but the founders failed to reproduce the old form.

That bell was very simple and had as sole ornament two inscriptions between the body and dome, placed one over the other; here is the first. + Salve Regin Misericordia. (Hail Queen of Mercy).

Between the words Regina and Misericordia was a ltttle figure of the Holy Virgin, surrounded by a halo with two points like a seal, after the last word were three seals.

The lower inscription bore in a single line and in smaller letters;.

Anno Domini millesimo CC°LXXtercio Godfridus me fecit et socios meos Paulus vocor.[1]

In the year 1203 Godfrey and his men made me; I call myself Paul.[1]

Note 1.p.284. We made leaden squeezes of these inscriptions that are deposited in the Museum of Cluny.

The first inscription had been made by means of strips of wax fastened on the model. We give (2) one of the letters of that inscription full size, so as to make understood the procedure employed by the founders. The casting of that mell was so clean, that all the delicate lines of these letters were o perfect, and the seals are as clear as the impression in Spanish wax.

The bell of Moissac from 12/3 was a very rare example, for we know of none so old; the metal was dark and very like the bronze of Greek statues; copper certainly entered into it for

Caumont. Vol. 10, p.93, Annales archeol. Vol. 16, p.325.

Note 2.p.281. Rational. Book 1. Chapter 4.

A distinction is to be made between several parts of bells, that each have a name; the edge or lower part, which is thin; the bow or thicker part, against which the clapper strikes; t the body or middle portion approaching the cylindrical form; the gorge or transition from the bow to the body, the point at which the bell becomes thicker, and the bell begins to assume a greater diameter; the upper part of the nearly cylindrical body and the dome; the top or upper dome receiving the ring suspending the clapper; the ears at the top by means of which the bell is hung from the axis. the clapper of wrought iron in the form of a very long pear terminated by a weight intended to give it more swing. The clapper has at the top of its stem a ring, that serves to attach it to the interior of the dome by means of a strong leather strap. Father Marsenne [1] first left a sure method for founding bells, he established the ratios that must exist between the dimensions of t the bell at all heights and the relative thickness of the different parts. The material serving for casting bells is an a alloy of rose copper anf refined tin. The copper forms three fourths and the tin one fourth. It has long been believed that silver added to the alloy gave bells a proper sound, and the piety of the faithful made that addition to the mixture in quite great proportion. It is certain that now has been renounced the casting of silver into the crucible by the founders of bells, and we are well disposed to believe, that formerly it entered into the purses of those manufacturers more than into their crucibles, for our sous, said to be made of bell metal and manufactured at the end of the last (17 th) century of the fragments of bells, contain only a very small part of silver; still it is found there.

Note 1.p.282. Harmonie universelle. Vol. 2. Book 7.

The casting of bells was formerly a great affair. The founders had no foundry, but went to the places where it was desired to cast the bells. A pit was dug near the church, a furnace was built, and for the inhabitants of the parishes, it was a serious matter to learn whether the casting was successful or not. One reads in the registers of the accounts of the work of the cathedral of Troyes, that in 1475 Jacques of Bouticle and Robinet Reguin came to Troyes, to cast several bells. To

to announce the holy offices. What cannot be doubted is that bells were hung above churches from the 7 th century.[1] These primitive bells however were of small weight compared with ours. The largest of the bells given by king Robert to the church S. Agnan of Orleans in the 11 th century, and that passed for an admirable work, did not weigh more than 2900 lbs. The bells given by Rudolph, abbot of S. Trond at the beginning of the 12 th century for the church of his monastery weighed from 225 to 3350 lbs.

William Durand begins thus his Chapter on the bells of churches; "The bells or campanes (campanae) are bronze vessels f first invented at Nola, a city of Campania; this is why the largest of these vessels are termed campanes from the province of Gampania, and the samallest are nolas, from the city of that name." But the opinion of the bishop of Mende, shared by S. Anselm, by Honore, priest of the church of Autun, and by Binsfeld, is based on no monument or any proof. Only later f from the 12 th century were given to bells considerable dimensions; at that epoch the art of the founder was already very perfected; it must necessarily be applied to the making of b bells. It is probable that only about that epoch in the manufacture of bells were observed two kinds of proportions, absolute and relative; the one that produced the sonority of the bell, the other that established the relations of harmony and of accord between several bells. To obtain these results today, there are formulas deemed infallible for the mixture of the metals and for the forms to be given to the bells; which do not prevent our founders from too frequently making bells with bad sound, while all the old bells still existing are r remarkable foh the beauty and purity of the sonorous vibrations. However as we do not desire to quarrel with the founders of bells, recognizing ourselves incompetent to discuss their art with a knowledge of the subject, we shall admit, if you please, that if the old and known bells are particularly remarkable for the quality of their soun, this is because by p preference all were broken up that were defective; now when a considerable number have been broken, our founders could s sustain that most of them were worthless.

Note 1.p.281. See Notices sur les Cloches, by abbe Barraud, inserted in the Bulletin monumentale, published by M. de Cau-

principals of the spire of the cathedral of Amiens (beginning of the 16 th century) are suspended from the principals. But identical constructions are found in much older carpentry, no notable in that of the cathedral of Paris, which dates from the 13 th century.

CLEF. Cleat. A term in woodwork.

A small cleat of hardwood is dovetailed in across and behind panels composed of joined boards, to keep them flat and prevent warping. These cleats are also termed dovetailed cleats. (Art. Menuiserie).

CLEF. Key. A term in ironwork. (Art. Serrurerie).

CLOCHE. Bell.

"The small people of the mob," says Thiers in his Traite des superstitions,[1] "run in a crowd from all parts of the church, not to pray but to ring. For it must be stated in passing that the rudest persons are those who love bells most and their s sound. The Greeks, who are a very civilized people, had few b bells before being subjected to Ottoman domination, and have scarcely any today, being obliged to use plates of iron or of wood to assemble the faithful in the churches. The Italians pride themselves on their spirituality and refinement and also have few bells; also these are not very large. On the contrary the Germans and Flemings have them large and in great number; that comes from their little refinement. Peasants and persons of low condition, children, fools, deaf and dumb, greatly love to ring bells or to hear them sound. Refined persons have no liking for that. The sound of bells bores and inconveniences them, makes their heads ache and deafens them." Thiers does not like bells and his whim says as much. Yet it must be confessed that the middle ages loved them greatly, a and made a prodigious quantity of them. Parish churches frequently possessed two bell towers' the abbey and cathedral churches even sometimes erected seven, that contained bells.

Note 1.p.280. Vol. 2.,Chap. 12. p. 180. Paris. 1741.

Bells or at least hand bells were known from Greek and Roman antiquity. Some authors claim that Pope Sabinien (604), immediate successor of S. Gregory, first prescribed the use of bells

and carved wood are set at the junction of ties or of longitudinal purlins with the curved ribs dividing the ceiling and serving to cover the joists.

We reproduce (25) a boss at the head of a kingpost, and(26) a boss masking the junction of a tie with the curved rib. These last bosses are very common in Anglo-Norman carpentry of the 15 th century, and they are perforated and carved with m much skill, breaking the monotony of these great tunnel vaults of boards. The great hall of the ducal palace of Dijon still retains beneath its wooden vault of the 15 th century pretty bosses thus arranged, that are enriched by gold and painting.

CLEF. Key, a term in Carpentry.

By the work key is designated in works of carpentry a small piece of wood designed to connect and fasten two twin ties. I Iron not being employed in old carpentry, these double ties were joined by means of wooden keys passing through two mortises and fixed by a little key or pin. Care was taken to cut these keys wit the grain of the wood, very sound and without knots, so that they could be easily driven into the mortises by a blow. We give (27) at A one of these keys separate, and at B two keys placed to fasten twin ties to a horizontal timber. The head C of the key bears against the tie, while the l little key D being driven in draws all tight.

But in certain trusses fitted with twin ties or hanging timbers, if for example a tiebeam is intended to carry a considerable load, it is desired to relieve it at certain distances by means of twin ties suspended from the principals, then instead of bolting these hanging twin ties to the principals by iron bolts, as practised today, wooden keys were passed across above the principals. In that case great strength was given to the wooden keys.

Fig. 28 will give us the arrangement of that piece of carpentry. Let A be the tiebeam to be supported and B the principal, two vertical twin ties C C are notched and tenoned to an upper key D; two pins prevent the verticals from leaving their gains and tenons; a wedge block G prevents the slipping of the upper key on the inclined principal, at E is a similar boxed key suspending the tiebeam. Such a connection has great strength. Thus are the tiebeams of the trusses bearing the hip p

examples here; the abuses and exaggerations of the decadence of Gothic style have so long been taken as the most complete and most happy expression of that art, that the works treating of the architectuhe of the middle ages are full of these extravagances, good for amusing persons, who only see in the art professed by us a piece of wit. We believe that we should be wanting to our readers, if we should fill our pages with figures possessing only the attraction of curiosity.

Exceptionally the constructors of the 12 th century have sometimes set bosses sculptured in the compartments of cross vaults. In England especially, this sort of decoration is very common in the 13 th century. The great boss of the vault of Notre Dame of Etampes, that we gave (3), is composed of s sculptures on the ribs and attached to the compartments. but in fact the four bosses of the compartments form a part of a single composition. We scarcely know in France more than one example of these isolated bosses on compartments, which exists beneath the vaults of the old sacristy of the abbey of Vezelay. (12 th century). As reproduced in Fig. 24, at A between the t two diagonal arches are placed the sculptured bosses, projecting from the surfaces of the compartments, and that are scarcely 12 ins. square. Fig 24 bis gives the detail of one of t them, representing a warrior fighting a dragon. The hall is c covered by six vaults thus decorated, and among these bosses are recognized the four signs of the evangelists within the circles of foliage. The closed vaults beneath the central bell towers of churches after the 13 th century are nearly all furnished with bosses of great diameter, pierced by a large hole for the passage of the bells; but these bosses are described in Art. Oeil.

Under the paneled carpentry ceilings constructed during the 14 th, 15 th and 16 th centuries, at the junctions of the head of the kingpost with the ribs and the upper cross-beam are at attached bosses carved in wood, forming an expansion of the foliage of ornaments, which marks the junctions of the timbers of the carpentry above the caps of these kingposts. These bosses are only ornaments without real utility, a carved band at the head of the kingpost; they produce a good effect and contribute to set off these tunnel vaults in wainscot with a quite poor appearance. Sometimes even the bosses of perforated

bosses of added parts attached to the real boss by iron bolts, and even sometimes to the tiebeams of the carpentry. There is no need to emphasize the inconveniences and dangers of that sort of decoration. Pendant bosses stress the vaults by their exaggerated weight instead of keeping them in proper equilibrium; they risk being detached by the rusting of the iron, t and falling on the heads of those present.

We just stated that some of these bosses are little models of monuments. We will cite among others those of the chapel of the Virgin of the church Ss. Denis and Protais at Paris, that represent an entire enclosure surrounding edifices ,and suspended beneath the vault. Those of the church S. Florentin in Burgundy, the church S. Pierre of Caen, that date from the beginning of the 16 th century, those of the high vaults of the choir of the church of Eu, etc. Examples abound. Then the cross vaults are not only composed of two diagonal arches, b but of a number of intersecting arches (Art. Voute). at the intersections of these arches are often found pendant bosses, projecting more or less and decorated, which gives to these v vaults the appearance of a grotto hung with enormous statalt-ites. These are caprices in stone more surprising than beaut-iful, which weary and occupy the eyes rather than satisfy th-em. Reason and taste are shocked by these affectations, whose motives are not understood, and that destroy the unity of in-teriors. We give (22) one of these bosses taken from the vau-lts of the choir of the church of Eu. We chose this example as one of the oldest, for it dates from the end of the 15 th century. To our mind it is also one of the most beautiful. T The pendant bosses of the vaults of the choir of that church, added in that epoch to an edifice of the end of the 12 th cen-tury, are also still nearly Gothic in ornamentation. Yet alr-eady is felt the influence of the Corinthian capital in the boss given here. It is further made of one block of stone and is not composed of pieces fastened together. In the same chu-rch we likewise see the transverse arches of the choir decora-ted by pendant bosses very skilfully arranged; we give one of them later.(23).

Normandy, England and Brittany have particularly abused that kind of decoration; but the reproductions of these oddities are too well known for it to be necessary to give numerous e

surfaces, that it was necessary to fix them afterwards, for it would have been impossible to place them on the top of the centering without breaking them. They they were hooked to the real boss by an iron rod passing through the central hole with a little key across the hole at the extrados. We give (21) one of these bosses from the middle of the 15 th century, taken from the vaults of the side aisles of the choir of the abbey church of Eu, restored about that epoch, and (21 bis) the section on the line a b of this boss, that is only a perforated and sculptured slab 1 1/4 ins. thick.

About the end of that century, men were not content with d decorating vaults by this sort of bosses. When the study of antique arts and those of the Italian Renaissance came to mingle with degenerated Gothic traditions, at first the principal forms of architecture were not changed. Those new elements w were attached to the details of the ornamentation. It seems that the French architects were pleased to cast into the midst of their combinations, still entirely Gothic in the entirety of the system of construction, fragments sought in the R Roman or Italian Renaissance monuments. In that our own Renaissance essentially differs from the Renaissance beyond the Alps. The Brunelleschis and later the Bramantes had possessed themselves of the general arrangements of antique architecture, far more than of the details; or rather Italian architects had never entirely lost sight of Roman arts, and to return to them only had to lay aside the corrupted traditions of the arts of the North, that during the 13 th and 14 th centuries had penetrated to Florence, Perugia, and into the papal states.

Toward the end of the 15 th century our architects conceived the idea of placing in their edifices reminiscences of the arts of Italy, while entirely Gothic in construction. For example, they found it clever to suspend from the vaults capitals or quasi-antique ornaments, even sometimes little models having nothing more of Gothic. Starting from that principle of the construction of the Gothic vault, that the boss should be heavy in order to prevent the rising of the ribs under the pressure of the haunches, they placed bosses with pendant ornaments resembling stalactites. This was the time of the greatest deviations in architecture; they were no longer content with a block of stone, and went so far as to compose pendant

the church, Peter de Roquefort; here is one of these latter bosses (20); the shield is azure with three rocks of or, two placed in chief and one in point; it is detached in the midst of the crown of oak leaves. As in the preceding example, two heads fill the two largest angles between the cross ribs. Rarely in the 14 th century are persons represented beneath the tablets of bosses.

We should not omit to state here, that nearly always the bosses of cross vaults are painted, even in monuments otherwise entirely without that kind of decoration. The painting applied to the bosses extends on the ribs to a certain distance from the centre. (Art. Peinture).[1]

Note 1.¢.271. Until the 16 th century, the custom was retainedfor painting the bosses of vaults and the painting on them the arms of sovereigns, bishops, abbots, lords, cities, etc. In the registers of the accounts of the work on the church of Troyes (folios 348 to 352) is read; that in 1463 a certain Ja Jacquet painted on the boss of one of the great vaults the a arms of the cardinal of Avignon; that in 1494 Nicolas Cordonnier, painter, painted the boss of the first vault of the nave then completed,"where are the arms of Monseignor grand archdeacon of Refuge;" that on the boss of the second vault he painted the arms of the city, then on the succeeding vaults those of the king and of the bishop of Troyes; that finally the boss of the fifth vault was gilded. (See Comptes de l'eglise de Troyes. Troyes. Bouquot. Edit. 1855.

It would be useless to give numerous examples of bosses of vaults of the 14 th century; they are always rosettes of leaves designed and treated more or less well, and that do not differ from the rosettes carved in the tympanums of gables or on all other architectural members. (Art. Rsaace). But the 15 th century brought into the sculpture of bosses the exaggeration that it put into everything. The rosettes of bosses of cross arches of the 15 th century forms a sort of open carved tablet placed over the junction of two arches. Instead of presenting crowns of foliage or rosettes, it dissolves into suspos comprised within geometrical lines and with a delicacy of carving, that recalls forms suitable for metal rather than th those proper for stone. Frequently these rosettes have such a refinement in work, so well perforated over their entire su

it most frequently reproduces that of the arches as in Fig. 17, or if it varies from that, this is to adopt a more vigorous profile and less hollowed. In that case (18) let A be t the profile of the cross arch, B will be that of the body of the boss. Beneath the cylindrical body a hollowed tablet C receives the sculptured rosette detached from the concave ground of the tablet C, whose highest point D is not above the level E of the prolongation of the curve of the intrados of the cross arches. Perhaps these details appear petty; but in the method of Gothic construction nothing is indifferent, and it is by research of this kind, the result of reasoning and experience acquired by repeated observations, that constructors of the good period of the middle ages succeeded in producing surprising effects with very simple means. Further, we refer our readers to Art. Construction, for all that concerns the construction of vaults in which the bosses play a very important part.

The 14 th century changed nothing in the mode of construction adopted for cross vaults during the first half of the 13 th century, and consequently the bosses were cut according to the same principle, but their sculpture became more meagre a and confused, the large leaves visible at great height were replaced by branches of delicate floiage, that are far from presenting such a satisfying effect. Examined closely, these bosses are however of perfect execution, the leaves being treated with care and surprising delicacy. We give (19) a boss of the beginniug of the 14 th century belonging to the old cathedral of Carcassonne, that retains the arrangement of the primitive bosses of the 13 th century, i.e., with two heads filling the two most open angles formed by the intersection of the cross ribs. One of these heads represents Christ, the other the Holy Virgin. The rosette is comprised of a crown of leaves springiug from a circular branch. We have traced t the section of this tablet at A.

Toward the end of the 13 th century the bosses of cross arches were often decorated by armorial shields, at first surrounded by ornaments, by foliage, then later being supported by angels or without accessories. The church of S. Nazaire, cathedral of Carcassonne, possesses bosses under which were carved the ancient arms of France and those of the founder of

and that later rosettes carved in wood were hooked up below a plain stone tablet; thus were decorated most bosses of the vaults of the lower S. Chapelle at Paris, and these rosettes are cut by a master's hand. We show an example here (15) that dates from about 1240. The foliage is rendered with flexibility that already emphasizes a seeking after the scrupulous i imitation of nature.[1]

Note 1.p.267. These are leaves from the maple of the forests.

The boss of the cross vault must first be placed at the crown of the centering before setting the voussoirs of the cross ribs, for it serves as a guide, a mark for turning the two c cross ribs so as to meet this at exactly the same level at t their point of junction. Without that precaution, one would never be certain in setting, however well shaped be the centering, of joining the cross arches at the same level (Art. Construction); it will be conceived therefore, that frequently to not delay the construction of the vault, men would not take time to allow the sculptur to carve the rosette; hence rosettes of wood were attached afterwards, also the absence of sculpture on ceatain bosses of vaults, if later were omitted the addition of the rosettes of wood beneath the tablets of stone left plain. If the extradoses of the cross arches are cut and do not enter into the compartments they are destined to support, it is not the same for the bosses; they nearly always have a projection entering the filling. Thus they present a point perfectly fixed at the crown of the vault, and besides also being almost always pierced by a hole for passing a suspending cord, it was necessary for their height to reach to the top of the filling. Fig. 16 represents a boss in section, and will make intelligible this mode of construction. But the boss being solid in the covering of the vault consequently cannot yield to the movements of the cross ribs, it was unnecessary to give the portions of the cross ribs extending from it a great length; for if these parts had projected very much, the least movement in the arches would have b broken them, and the boss would no longer have fulfilled its purpose. Thus the bits of the cross arches attached to the bosses are cut off as closely as possible to the circular body of the boss, as indicated by Fig. 17. As for the profile given to the body of the boss of the vault with cross arches,

fracture, and connected the two most distant branches of the groin ribs. The onnamentation of Gothic monuments always finds its origin in anaeed of the construction; we are too much disposed to see in the sculpture of edifices merely a caprice of the artist, while it is often the result of reasoning.

In the 13 th century the sculpture of bosses is more commonly composed of foliage admirably arranged and without confusion, with dimensions in proportion to the size of the vaults. The nave of Notre Dame of Paris, whose vaults were erecte about 1225, possesses bosses arranged like those of the choir, but of a design far more beautiful and skilful. Those of the refectory of the abbey of S. Martin-des-Champs at Paris date from the same epoch and are remarkably beautiful. The cross arches intersect at right angles without transverse arches, so that it was unnecessary to reserve there the projecting he heads in the angles; these bosses are composed of a simple r rosette of leaves. We give one of them. (13).

It must not be believed however, that the sculpturs in the 13 th century renounced the representation of figures in the bosses of vaults, but they reserved them more particularly for sanctuaries; crowns of foliage ornamented the bosses just as crockets and bunches of leaves did the capitals. At that epoch when the bosses represented subjects, these were treated with remarkable delicacy in execution. One of the most beautiful bosses with subjects known to us is sculptured over the sanctuary of the collegiate church of Semur in Auxois, whose were erected about 1235. That boss represents the coronation of the Virgin in the midst of foliage. Christ leans on the s sacred volume and blesses his mother. An angel places the divine crown on the head of Mary. Two other angles are at mid-height above the bramches and each bears a wax candle. All t the sculpture covers a tablet over a yard in diameter, and is entirely paented, the foliage green, the ground reddish brown, and the vestments of the two personages are of different colors, in which blue and red predominate. We give (14) a copy of that beautiful boss.

If frequently occurred in building, that the sculptors had not time to carve the bosses before setting, or that the projection of the sculpture preventing the setters from placing the boss on the centering, it was left plain in the interior.

fracture, and connected the two most distant branches of the groin ribs. The ornamentation of Gothic monuments always finds its origin in a need of the construction; we are too much disposed to see in the sculpture of edifices merely a caprice of the artist, while it is often the result of reasoning.

In the 13 th century the sculpture of bosses is more commonly composed of foliage admirably arranged and without confusion, with dimensions in proportion to the size of the vaults. The nave of Notre Dame of Paris, whose vaults were erecte about 1225, possesses bosses arranged like those of the choir, but of a design far more beautiful and skilful. Those of the refectory of the abbey of S. Martin-des-Champs at Paris date from the same epoch and are remarkably beautiful. The cross arches intersect at right angles without transverse arches, so that it was unnecessary to reserve there the projecting he heads in the angles; these bosses are composed of a simple r rosette of leaves. We give one of them. (13).

It must not be believed however, that the sculpturs in the 13 th century renounced the representation of figures in the bosses of vaults, but they reserved them more particularly for sanctuaries; crowns of foliage ornamented the bosses just as crockets and bunches of leaves did the capitals. At that epoch when the bosses represented subjects, these were treated with remarkable delicacy in execution. One of the most beautiful bosses with subjects known to us is sculptured over the sanctuary of the collegiate church of Semur in Auxois, whose were erected about 1235. That boss represents the coronation of the Virgin in the midst of foliage. Christ leans on the s sacred volume and blesses his mother. An angel places the divine crown on the head of Mary. Two other angles are at mid-height above the branches and each bears a wax candle. All t the sculpture covers a tablet over a yard in diameter, and is entirely paented, the foliage green, the ground reddish brown, and the vestments of the two personages are of different colors, in which blue and red predominate. We give (14) a copy of that beautiful boss.

If frequently occurred in building, that the sculptors had not time to carve the bosses before setting, or that the projection of the sculpture preventing the setters from placing the boss on the centering, it was left plain in the interior,

the sculptures of the 13 th century understood much better t than those of the 12 th the effect to be derived from rosettes placed at the junctions of arches.

But before presenting examples of these bosses from the 13 th century, it is necessary for us to speak of the bosses of secondary vaults. generally during the second half of the 12 th century these are small and very simple; sometimes they e even disappear, and the cross arches intersect without being strengthened by this ornamental addition.

At Paris, S. Denis in France, Noyon, Senlis, S. Etienne of Beauvais, we see the cross arches of vaults at the boss pierced by a hole surrounded by a meagre rosette. As in the last church it has occurred (8), that the stonecutters did not know how to join the two cross arches. Here the ornamental rosette does not cover the intersection of the arches, and their double rounds bend in joining the boss. At the cathedral of Senlis the cross arches of the vaults of the side aisles being composed of a single round, the smallness of the rosette decorating the boss scarcely covers the intersection of those rounds. Here (9) is one of those bosses. Sometimes as in the v vaults of the side aisles of the church of the Madelaine of Chateaudun, the ornament of the boss only consists of an interlacing covering the junction of the rounds.(10).

In the part of the cathedral of Paris constructed by Maurice de Sully (about 1170), the bosses of the cross arches present only rosettes of slight projection not exceeding the intersection of the cross arches, and their decoration only consists of tablets in which are carved Greek crosses with cusps. But the great vaults of that church, like most of those of all F French churches of that epoch, are composed of two cross arches and a transverse arch intersecting at the boss. In this p particular case (11), there remain at A and B two free spaces that the sculptur filled with human heads placed along the m mouldings. The carved boss at the junction of the ribs of the apsidal vault of the cathedral of Paris simply consists of a Greek cross with cusps, with a head in the space opposite the junction of the radiating ribs.

We give (12) a drawing of that boss, that well shows the u utility of those filling heads; they gave strength to the boss at the point where a considerable hollow might have caused a

should produce.

The great apsidal vault of the abbey church of S. Germer in Beauvoisois shows us one of these great bosses. The ribs of that apsidal vault join at the crown of a transverse arch, a very bad arrangement and rarely found except in primitive G Gothic monuments; the boss is only a half boss abutting against the crown of the transverse arch, it has considerable dimensions; the ribs are covered by sculptures for their entire length, and the angles left between them are ornamented by a cross, by figures of dragons and of basilisks.(6).

From the end of the 12 th century the bosses of apsidal vaults or of chapels represent, sculptured on their inner face, not only sacred personages such as Christ blessing or surrounded by angels, the Virgin, the Lamb, signs of the evangelists, as in the terminal chapel of the great hall of the hospital of Chartres; saints and martyrs; but also sometimes bishops or abbot founders, also subjects as for example, signs of the zodiac, animals taken frog books of animals, etc. In the vault of the apsidal chapel of the abbey church of Vezelay, whose construction dates from the last years of the 12 th century, may be seen a very beautiful sculptured boss representing the sign of Aquarius under the form of a young man scarcely clothed, holding a long vase from which the water runs, and surrounded by scrolls.

We give here (7) a copy of that boss. It will be noticed t that the boss is only an ornament detached from the arches of the vault; that boss has no back and the arches pass and intersect behind it. That is one of the special characteristics of the rich bosses of the end of the 12 th century. When one examines the bosses of the vaults of that epoch it is easy t to recognize that the architects confided these parts of the interior decoration to the most skilful sculpturs. Whatever the height at which were placed the bosses of vaults of the 12 th and 13 th centuries, they are always designed with elegance and executed with care that indicates the importance a attached to those pieces of sculpture. But it must be stated that the artists of the 12 th century did not always take an exact account of the effect, which they desired to produce at great heights, and certain bosses seen near are true masterpieces, but produce little or no effect because of the distance separating them from the eye of the spectator; in that respect

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We give (3) one of these magnificent bosses, although properly speaking, the angels do not form a part of the boss, those sculptured on the ribs being on the voussoirs next it, and t those on the compartments being attached in the upper courses of rubble. Their wings are fastened to the vault by cramps. These figures were formerly painted, and today a yellowish w wash covers them as well as the rest of the vault.

We see beautiful sculptured bosses dating from the end of the 12 th century in the vaults of the cathedral of Laon, and here the figures are not attached around the boss, as at Etampes, but belong to that principal part of the vault. At the junction of the eight cross arches bearing the apsidal vault of the chapel of the north transept of that church is a boss representing an angel holding a scroll in the middlo fo a crown of foliage. The head and the wings of the angel are represented in the most open angle between the arches and toward t the entrance of that chapel, thus filling in graceful fashion the space produced by the junction of the two principal ribs. Here (4) is that finely sculptured boss, and which according to the custom then adopted was painted in various colors. Already at that epoch not only were sacred figures sculptured on the bosses of vaults, but it was sometimes attempted to d decorate them by foliage arranged with elegance. The vault of the upper chapel of the south transept of the cathedral of L Laon presents one of these bosses surrounded by finely carved and painted leaves; at the side with the most open angle, as in the preceding example, the foliage escapes from the central rosette, interlacing and ornamenting the joining of the two principal arches. We give (5) that pretty boss.

But the two last examples belong to vaults of small dimensions. In constructing cross vaults, the architects of the second half of the 12 th century recognized, that it was of great importance for the stability of these vaults, for the bosses to have a certain pressure, and consequently a considerable weight relatively to the voussoirs. So starting from that principle, they gave unusual volume to the bosses, increasing them by strong projections, and to disguise the apparent heaviness of these great blocks of stone suspended at the crowns of the vaults, they covered them with sculptures skilfully a arranged for their elevated position, and the effect that they

necessary to have recourse to Burgundy, or rather to the order of Cluny, and to Ile-de-France. Indeed the oldest boss of cross arches that we know is to be seen in the gallery of the p porch of Vezelay. All the vaults of that porch, except two, are still without groin arches; one of these two vaults, whose construction dates back to about 1130, presents at the intersection of two arches a beautiful and richly sculptured b boss, that we give (2). Pierced at the centre to allow the p passage of a cord that suspends the chandelier, that boss presents at two sides between the groin ribs figures of cherubim with halos, whose eyes are filled with black cement representing the pupils. Around the central hole drop leaves largely recurved.[1]

Note 1.p.258. This boss was broken into several pieces and had to be replaced for solidity; but it has been scrupulously reproduced, and the fragments of the old boss were deposited in the museum of the church.

The diea of suspending figures of angels from the vaults must naturally present itself first, and many vaults of churches of the second half of the 12 th century were decorated in this manner. But few exist today that date from that remote epoch, the 13 th and 14 th centuries having rebuilt great numbers of vaults because of fires or faults in the primitive c construction, frequently executed by architects that experimented. One can admit, if he examines the few examples still existing in our days, that the artists of the 12 th century lavished sculpture on vaults, a sort of decoration abandoned by the masters of the 13 th and 14 th centuries.

About 1160 the architects not only sculptured the bosses, but the groin ribs themselves, frequently causing the carving of statues in their imposts above the capitals. (Art. Sommier). After the example of the boss represented in Fig. 2, one of t the most ancient and most remarkable is certainly the collection of bosses still to be seen in church Notre Dame of Etampes. Three of those vaults are decorated at the junction of the diagonal arches, one of the figures of kings being reproduced at half length, issuing from the apex of the angles formed by the intersection of these arches, and the two others by eight seated figures of angels, four on the ribs with lowered wings, the four in the angles with wings displayed.

knows the admirably sculptured keystones of the arches of Trajan, Titus, Septimus Severus and Constantine at Rome. We see keystones sculptured over the principal entrances of the arenas of Nimes, those entrances having no other mark to distinguish them from the other arches surrounding the edifice. The middle ages do not appear to have continued that tradition, even in the early time; its archivolts present a series of uniform voussoirs, and most frequently even the constructors neglect to reserve the place regularly given to the keystone; a joint replaces it. The archivolts of the cloister of the c cathedral of Puy-en-Velay shows us on the exterior keystones decorated by sculptures. A part of that cloister dates from the 10 th century, but it was almost entirely rebuilt in the 12 th, and the last architects retained on the keystones of t the archivolts that kind of ornamentation, probably not to d derange the harmony of the whole. We give here (1) one of these keystones representing an animal with the head of a woman. A Although in pointed arches there is no keystone, properly speaking, yet the architects of the Gothic epoch have sometimes terminated the archivolts of the portals of churches by a keystone, or rather by two half voussoirs cut in a single stone, and on which they carved a figure having to occupy a place of honor, for example, like the bust of Christ, or sometimes of the Eternal Father, towards the 16 th century.

CLEF D'ARC OGIVE. Boss of Cross Vault.

The architects of the 12 th century having invented the pointed cross vault, soon sought to place one of the most beautiful motives of interior decoration at the junction of the t two crossed arches, that support the Gothic cross vault. The meeting of these two projecting arches requires a keystone f from the point of view of construction, i.e., a single block of stone closing the junction of the two arches by joints normal to the courses. If there were some experiments in the mode of joining these arches (Art. Construction), they were not of long duration; for as soon as we see the cross arches adopted, there appear the sculptured bosses. However that decoration is not developed everywhere with the same freedom; abundant and rich from the origin in some provinces, it is poor and t timid in others. As for the sculpture, it is almost always n

forms a little corbel servingas the springing of this supplementary member. These details are interesting to observe, for they demonstrate how the constructors could disguise errors or irregularities, that could not fail to appear in the complex details of Gothic architecture, and how they always found resources, when it was necessary to free themselves from difficulties occurring in the entirety as well as in the smallest details of their constructions.

CLAVETTE. A little Key.

This name is given to a little iron key serving to fasten the end of a bolt, (Art. Boulon), or the panels of glass windows. During the middle ages windows formed by combining glass k kept in place by leads were set in panels between iron bars f fitted with staples. Little keys passing through these staples were intended to prevent the displacement of these panels; t thus these keys could fasten the edges of the panels, without cracking the glass, to the horizontal or vertical iron bars, and to be able to remove them easily in case of repairs, to them was given the form indicated in fig. 7.(Arts. Armature, Vitrail).

In carpentry, ironwork and heavy woodwork, the little keys passed through the ends of rods frequently doubled at the end; the two ends being recurved, the key could no longer slip out. (Fig. 2).

CLEF. Keystone. Crown. Boss.

This word is applied to works of masonry and signifies the keystone that closes an arch, set on a vertical line through the centre of that arch. There are keystones only in round a arches; pointed arches being formed of two circular arcs, have only imposts of voussoirs; the keystone in that case is replaced by a joint.

CLEF D'ARCHIVOLTE. Keystone of an Archivolt.

The Romans and before them the Etruscans frequently decorated the keystone of the archivolt in the richest manner, chiefly when these archivolts surmounted the entrance of an edifice or the principal opening of an arch of triumph. The keystone in that case was a sign indicating a passage. Everyone

primitive rule, viz:-- that each ornament or figure must be comprised within one voussoir. There are very few exceptions to that rule. Still in the western portal of the abbey church of S. Denis are seen the figures of the 24 old men of the Apocalypse carved on two or three voussoirs, and consequently cut in place after setting. The voussoirs of platbands are r rare during the Romanesque and Gothic periods; yet in some provinces where stone for building was only quarried in small dimensions, it was necessary to use lintels of doorways composed of voussoirs. In Beauvoisois are very frequently found j jointed lintels of doorways belonging to the 12 th century; but the voussoirs of platbands ar that epoch never present j joints tending to a centre as in Roman architecture; they are supported in their places by means of indented joints, that make slipping impossible. One of these lintels of doorways m may be seen along the north side of Church S. Etienne of Beauvais (7). The difficulty resulting from the cutting and settind of platbands cut thus caused in the 13 th century, when s stones of large volume were quarried, that men abandoned this complicated means of construction, except in absolute necessity, for example on mantles of fireplaces; in that special c case the voussoirs of mantles are cut with offsets or with r radial joints. (Arts. Appareil, Cheminee).

When in the 13 th and 14 th centuries were adopted vaults with pointed arches divided into a certain number of mouldings, rounds, fillets, coves and hollows, it sometimes occurred, th that the impost being set already cut according to custom, t the mouldings of the voussoirs did not exactly accord with t those of the imposts; so that offsets occurred. For example, the round A of the voussoirs (8) does not accurately fall on the round B of the impost; the stonecutters perceived this d defect in cutting and set a transition voussoir C with a like ornament or leaf on the mouldings, that disguised the offset. There exists a certain number of second voussoirs and of imposts with that addition in the pointed arches of the vaults of S. Nazaire of Carcassonne (beginning of the 14 th century). That is then a certain proof of the cutting of all members of mouldings before setting. Sometimes also the voussoirs possess members of mouldings, that the stonecutters did not take the precaution to reserve on the imposts. Then a head or a flower

This rule is obeyed in such an absolute manner, that when in the same arch the voussoirs are of unequal thickness, the ornament conforms to the dimensions of each stone without deranging the symmetry of the decoration.

Fig. 3 explains what is stated here.

Sometimes about the end of the 12 th century the voussoirs of moulded arches are in pairs charged with an ornament. This arrangement is frequent in the monuments of Auvergne. Thus t the pointed arches of the south porch of the cathedral of Puy-en-Velay (4), which date from the middle of the 12 th century, are composed of voussoirs alternately moulded and sculptured. The south portal of the church of Ennezat near Riom, of a later epoch (beginning of the 13 th century) presents a similar arrangement in its archivolt.(5). In that province, the south of France, and even in Burgundy, when the nature of the materials permits, the voussoirs of arches are cut in stone of two colors. The construction being made apparent thus contributes to the decoration, without having recourse to sculpture or to applied painting.

During the course of the 12 th century, particularly in Beauvoisois and Normandy, the voussoirs of archivolts are hollowed so as to present interlacings of zigzags, of broken rounds and even of sculptured ornaments. In the Anglo-Norman architecture of that epoch are found the most complicated combinations and the best hollows. The two lateral portals of the western facade of the cathedral of Rouen, whose piers and archivolts date from about 1160, furnish us with the richest examples of these cut voussoirs, hollowed, and carved with rare d delicacy and precision.

Here are two roses of these voussoirs, these represent at A present a row of entirely open interlaced leaves, behind which the sculptors have had patience to chisel the palm leaves that cover the bottom of the hollow as indicated by the section E. At C is traced the bottom of the hollow; at D are the palmatiums, and at E are the perforated floiage contained exactly in the panel of the voussoir. The other row of voussoirs represented at F presents designs sunk into the panels; that sort of decoration sunk deeply gives the section G. Later the scrolls of foliage and more frequently figures, decorate the voussoirs of archivolts, but always observing the primit-

as indicated by Fig. 1. The tank was filled with gravel and charcoal. Water was drawn from the listern through a hole pierced in the vault, fitted with curb, windlass and bucket. C Cisterns always had an overflow pipe and sometimes a duct for emptying them. We have noted in mediaeval cisterns, that the overflow pipe is so located, that the water does not rise aboverthe springing of the vault.

CLAVEAU. Voussoir.

Name given to one of the stones cut in wedge shape, that form arch or platband, and are found between the impost and keystone. Mediaeval constructors haveng employed the jointed platband only exceptionally, we shall first consider voussoirs of arches. As a general rule, the section of a voussoir is always normal to the curve of the arch; in other terms, the voussoir must be cut according to the direction of the radius of the arch.(Art. Construction). Voussoirs in the architecture of the middle ages always having cut intrados and extrados with rare exceptions, it follows that the voussoirs of an arch are all of the same form and dimensions, as proved by Fig. 1. At are the imposts, B the keystone, C the voussoirs.

During the first centuries of the middle ages in France, o one frequently finds stone voussoirs alternating with bricks in arches. This was a relic of the traditions of Roman construction of the late empire. The windows of the Lower Work of Beauvais, whose construction probably dates back to the 8 th century have their arches thus composed of stone voussoirs separated by one or two bricks. (2). Thus was obtained ornamentation at little cost. The voussoirs of arches often received mouldings dating from the 12 th century; until that epoch they are generally cut with sharp angles or sometimes as half cylinders. (Art. Arc). Members of Roman architecture in its decline are very much loaded with ornaments; not only capitals of friezes are covered by them, but even the columns and the archivolts supported by them. The ornaments most commonly carved on the archivolts during the 12 th century are billets, sawteeth, chess-boards, bezants, zigzags, frets, interlacings, etc. These ornaments are always composed in the height of each voussoir, so as to be able to carve them before setting, and to fit them end to end, forming a continuous decoration.

Note 2.p.248. See Pref. des crhon. de Normondie, by Francisque Michel. p.42.

Some cemeteries of great cities were very richly decorated by cloisters, on whose walls are painted the danse of the dead, the legend of the three dead and the three alive, the scenes of the Passion of our Lord. However during the middle ages c cemeteries independent of the churches were the exception; t they did not form a complete structure, as in Italy; they were scarcely more than an enclosure within which the ages accumulated without order private monuments, portions of galleries, small chapels, crosses, ossuaries, little structures of all sorts. The monumental cemetery arranged in symmetrical fashion only belonged to religious establishments, and when not a simple enclosure, it then becomes the arrangement of the cloister. (Art. Cloitre).

CIRCONVALLATION ET CONTRAVALLATION, LIGNES DE.

Double enclosing lines of Fortifications.

Ditches with or without ramparts of earth and palisades, t that besiegers constructed around an invested place, in order to shelter themselves from sorties or from aid from ouhside, and to entirely shut up the besieged. (Arts. Architecture Militaire, Chateau, Siege).

CITERNE. Cistern. Tank.

A receptacle designed to collect and preserve rainwater. A Abbeys and castles of the middle ages, often located on high hills without natural springs; this lack of water was supplied by cisterns cut in the rock or built of masonry, in which was led by conduits the rainwater falling on the roofs of the buildings and the areas of the courts.

The cloister of the abbey of Wezelay possesses a fine cistern of the 12 th century, composed of two vaulted aisles supported by a row of small square piers. That cistern was not the only one belonging to the abbey; they were all cut in the rock and carefully coated inside. Nearly all cisterns of the middle ages were provided with a tank destined to first receive the water, and to discharge it purified into the cistern. For this purpose a tank was placed above the bottom of the cistern, composed of a trough pierced by holes in the sides,

of the deceased.

When churches could be built on the ground, men desired to be interred, if not within their walls, which was not permitted in the first centuries, at least as near as possible to their walls, beneath the eaves of the roof, and these churches were soon surrounded by vast fields of rest. But in populous cities, men did not delay to recognize the inconveniences and even dangers of that custom. Churches must group around themselves certain necessary dependances in the midst of cities enclosed by walls, ground became scarce as population increased, and it was necessary to retain those enclosures solely devoted to the burial of the dead. Toward the end of the 12 th century, the churches commenced to receive beneath their pavements the bodies of their bishops, abbots, canons, then princes and lords, and toward the end of the 13 th century e even those of lay commoners sufficiently rich to obtain that favor. In the country and the little cities, the churches retained their cemeteries around their walls. These cemeteries ordinarily contained besides the tombs, a chapel, a pulpit a and a lantern of he dead.(Arts. Chapelle, Chaire a Precher, Lanterne des Morts). Sometimes porticos erected along the walls of the enclosure served as walks, and as burial places r reserved for privileged families. In the vicinity of great c cities or frequently under the shelter of their walls, it was necessary to establish cemeteries, those surrounding the churches not being sufficient, or private habitations having gradually encroached on the consecrated ground. Tose cemeteries must be enclosed, which most frequently served at night as a retreat for criminals and prostitutes; thus they became asylums. During war cemeteries in the country were regarded by the peasants as inviolable enclosures; they deposited there their farming implements, furniture and even cattle. (Old French poem).[1]

Note 1.p.248. Roman de Rose. Verse 1_,978, et seq.

At night the lantern of the dead, a sort of hollow column at the top of which burned a lamp, warned strangers that it was a field of rest. That lantern was also designed to exorcise apparitions of evil spirits, vampires, man-wolves, that caused terror among the peoples of the North and West. (Old French text).[2]

mincing Christ with effeminate face, perfumed hair and sluggish walk. In our time have been sought purer inspirations. B But perhaps our artists would do wisely to go occasionally to see the Christs of Chartres, Amiens and Paris; if these visits do not produce new masterpieces, they will avoid that pale a and sickly countenance, that men are pleased to give to the Saviour today, those visionary, undecided and wearied features, rather sad than serious, that bearing rather famished than gr graceful. Certainly the reading of the gospels is very far f from tracing mentally such a portrait. The motto of the middle ages, "Christ conquers, Christ reigns, and Christ commands," however triumphant it may be, is made to elevate the statuary, and leave a living and frank impression in the souls of the faithful, while the sight of an emaciated, poor and weakly n nature inspires contempt in energetic souls and even weakens feeble ones.

CIMITIERE. Cemetery.

A consecrated enclosure in which are interred the dead. It was customary among Greeks and Romans to burn the corpses, to place their ashes in urns of marble, stone, terra cotta, or in sarcophaguses, and to deposit these remains in monuments erected in memory of the deceased, or in excavations cut in the rock. Antique cities like Syracuse, Akragas, Athens and Rome are still surrounded by numerous excavations or by monuments serving as the last dwelling for the dead of the city. The f first Christians did not burn the corpses. How could then have done so? At Roma taking refuge in the catacombs, vast incient quarries, where they celebrated their holy mysteries, t they desired to deposit the remains of their martyrs and their brothers in religion dying naturally. For that purpose they cut in the walls of those vast galleries cavities of the size of the humau body, and after having deposited the bodies, they sealed up the opening either with a slab of stone or of marble, or by means of a simple masonry wall. Thus the idea of being buried near places consecrated to worship took root among the first Christians.

S. Augustine says in his book; "On the care to be taken of the dead," that to bury the dead person near monuments erected to the memory of the martyrs will be profitable to the soul

the 13 th century the grand figures of the Christ-man or triumphant placed on the portals of churches become rare. The sculptors appear to give the principal place to the Holy Virgin, and Christ is relegated to legendary subjects, or if he appears as triumphant, his dimensions but slightly exceed those of the other personages. He is represented as a bust rising from clouds, at the top of the tympanum or in the bosses of vaults, while the representation of the Virgin Mary occupies the chief place until the 16 th century. (Art. Vierge). The types of the Saviour being lost at the end of the 13 th century, we do not have to consider them here; these figures return to statuary. For Christ crucified, we refer our readers to Art. Crucifix. Painting follows the same phases as sculpture in the representation of Jesus Christ, more slowly it is true, during the middle ages in France that art being a half century behind sculpture. But at the end of the 13 th century Byzantine traditions are entirely abandoned in painting, just as in sculpture. They are seen to persist longer in Italy, a and the Christ of Giotto, Orcagna, Buffelmacco, Simon Memmi, still retain something of the primitive type. This respect f for ancient form goes much farther among Italians; we find traces of it among the painters of the Renaissance, but which has retained nothing of the hieratic art of Cimabue or of his predecessors. Titian knew how to give to his figures of Christ that calmness, nobility, grandeur, that countenance above humanity, that we admire in our beautiful statues of the 12 th century and the beginning of the 13 th, which did not prevent that great artist from executing the painting of his time, and in which he certainly did not seek archaeological imimation. It is not given to all artists to attain that height, and we should refrain from reproaching those, who for three centuries have executed paintings or sacred sculpture; but perhaps what one has the right to require from them is the study of those types so admirably interpreted in some works of the middle a ages, especially in France. Since the Renaissance, men have pleased to paint Christ either as handsome or terrible. Michelangelo in his last judgment made Christ a sort of Hercules in wrath, who struggles on his throne, and occupies himself exclusively with the damned, that he sends with furious gestures to all the devils. Then came the Christ-Apollo, then the

definitely adopted. Then he is clothed in the long tunic and the mantle; he holds the book in the left.hand and blesses w with the right; his feet crush the head of the dragon and the basilisk, images of the demon. Among these figures still preserved now in very small number, thanks to the iconoclasts of the 16 th and 17 th centuries, the most beautiful, and whose character most nearly approaches the Byzantine type without having its dryness, in our opinion, is the statue of the Christ-man of the cathedral of Amiens. Fig. 4 gives it as a whole; not that we hope to present in a sketch the appearance of grandeur and of nobility of that remarkable statue, for this is only an indication. The type of the head of the God of Amiens presented in profile (5) merits the entire attention of statuaries. This sculpture is treated like the so-called Eginetan heads; the same simplicity of modeling, purity of contours, broad and refined execution at the same time. These are indeed the characters indicated in the mention above; combination of sweetness and firmness; gravity without sadness. That head is more remarkable than the heads of the apostles near it, a and which were executed at the same time, are far from presenting that divine nobleness. Those are men, even portraits, in most of which are found the Picard type. The artist who executed the figure of Christ then followed the consecrated type, and with the flexibility of talent pertaining to the sculptors of that epoch, he knew how to distinguish from all the statue of Christ, giving him features and a countenance above t the human models at his disposal. But the limit between the hieratic and the imitative are is easily passed over by all artistic peoples; they do not long remain at it. The Greeks of antiquity passed it in some years; it was the same in France. Already about the middle of the 13 th century, the representations of Christ have lost that superhuman nobility; t the sculptors devoted themselves to the imitation of nature, losing sight of the primitive type, making the Son of God a beautiful man with mild looks, smiling mouth, beard carefully curled and curly hair, slender limbs and an affected pose. In the 15 th century these defects, at least in our opinion, fell into exaggeration, and the last traditions were lost in the search for details, in an elaborate execution of a certain affected grace. It must also be said, that from the end to

Christ in glory, was likewise abandoned the costume and the oriental treatment. Yet the type of the features given to Christ es modified somewhat; the face is shorter, the hair becomes wavy on the temples instead of lat, the eyes are less open and the mouth less refined; the features approximate more to humanity, alread is felt the influence of western realism, that replaces the consecrated types. The great Christ of the judgment on the portal of the cathedral of Paris merits study in that respect. That figure is further very beautiful and has nothing hieratic. And in that respect we must mention here a remarkable fact. In taking up the substructures of the chapels situated at the north of that church, chapels whose construction cannot be later than 1235 or 1240, we have found fragments of a colossal Christ evidently coming from a great tympanum, with traces of the four animals and of the book. That sculpture belonged to the last years of the 12 th century, and has great beauty in the execution. It is then necessary for the types adofted by the 12 th century to be rejected by the 13 th, for it to be decided some years later, when the principal portal was erected about 1220, to destroy such important sculpture and to substitute for it what we see today. Further, it is well to note again here, that the Christ of the tympanum of the principal portal of Notre Dame of Paris, as well as the statue of the angel holding the nails and the spear, appear in execution somewhat later than all the statuary of that portal, and that these figures are not carved in the tympanum, but are statues placed beside each other on the lintels and connected by a layer of mortar. Therefore in the 13 th century there was a decided will among the high clergy to modify the types of Christ in glory, sacred until then. Christ in glory must no longer appear except as on the day of judgment. We have thought it well to enlarge on this fact that appears to us of great importance for the history of art.

Note 1.p.241. Revelations. Chapter 19. Verses 11 -17.

But while the sculptors modified thus Byzantine traditions of Christ triumphant, they must at the same time execute statues of the Christ-man, the Christ on earth, teaching in the midst of his apostles. Thus is he reproduced on the mullions of the portals of most of our French cathedrals. It was scarcely before the 13 th century, that this representation of Christ was

by the painters of the 11 th, 12 th and 13 th centuries vary infinitely, which does not allow the assumption, that in the West certain symbolical colors were adopted for the vestments of sacred personages. During the course of the 12 th century, Christ triumphant, whether painted or sculptured, is nearly always represented as surrounded by the four signs of the evangelists, the apostles or the twenty four old men. At Vezelay the apostles are seated around him. (Art. Apotre). At the western portal of Notre Dame of Chartres, whose tympanum dates from about 1150, there are the four animals, the apostles anf the old men of the Apocalypse. At S. Savin there are in the painting the four animals, that accompany the circular halo of the Son of God. At the cathedral of Autun (about 1150', there are the apostles, angels and demons, the last judgement, the weighing of souls. At the south portal of the church of Moissac, same epoch, Christ has a square crown; his bust alone is enclosed by the elongated nimbus; at his feet are the lion and t the ox; beside his shoulders are the angel and the eagle; two angels of colossal dimensions stand at right and left; then come the 24 old men beneath his feet and behind the two angels.(Art. Tympan). Here Christ holds a closed book in the left hand and blesses with the right, as at the portal of Chartres; while at Vezelay and at Autun he has the hands extended and open. It is certain that during the 12 th century the dominant idea of the sculpturs, when they represented Christ in his g glory, was to approach the vision of S. John. In the 13 th century Christ in glory is represented during the last judgement; he is half nude and shows his wounds; around him are angels holding the instruments of the Passion, sometimes also the s sun and moon; at his feet are developed the scenes of the resurrection and the separation of the good from the wicked. Thus he is represented on the principal portal of the cathedral of Paris, the south portal of the cathedral of Chartres, the north portal of the cathedral of Bordeaux, the west portal of the cathedral of Amiens, etc. Then the four animals only occupy a very secondary place or entirely disappear. The Frence clergy of the 13 th century had evidently desired to adopt the scene of the judgement, much more dramitic, much more easily understood by the multitude, than the visions of S. John. In abandoning the Byzantine traditions for the manner of representing

cathedral of Puy-en-Velay some years since approach even more to the Greek types. This is not to state that we regard the paintings of S. Savin or of Puy as having been executed by G Greek artists; on the contrary it is certain that they are t the work of western painters. The dramitic pose has nothing of the Byzantine; it is only the method, in the procedures c and some types, like that of Christ, that the trace of the a arts of the East makes itself felt. Fig. 2 will dispense with long discussions of that subject. We shall have occasion to return to these influences of schools in the Art. Peinture.

Particularly in the representations of Christ triumphant in the midst of his glory, it is nece sary to study the appearance given to the Son of God during the middle ages; for in treating this subject the artists have undertaken to render the fa face and the pose given to the Saviour by tradition.

During the Romanesque period and until the end of the 12 th century Christ triumphant, represented in sculpture or painting, is ordinarily enclosed by an elongated nimbus, as represented in Fig. 1, which does not exclude the cross-shaped halo about the head. In paintings, for example as at S. Savin, the halo surrounding the body of Christ triumphant is often circular; we do not know it with that form in the sculptured representations. Further these rules are not without exceptions. In the crypt of the cathedral of Auxerre exists a painting, probably from the end of the 11 th century, that shows Christ triumphant on horseback (3) according to a vision of S. John.[1] It is placed on a great cross ornamented by painted gems and covers the vault. In the four spaces left between the arms of the cross are four angels also on horses; the head of Christ alone is haloed. It is true that the cross may pass for a sign of triumph and take the place of a great halo. In these two painted representations the hair of the Saviour is blond and the beard black. The vestments of the Christ of S. Savin are colored thus; the robe is green with a white border, the mantle is yellow; the border of the robe over the chest is reddish-brown with white ornaments. The halo is red crossed by white. The robe of the Christ of Auxerre is white bordered by reddish-brown, the mantle is light blue on the shoulders, reddish-brown bordered by yellow over the chest; the halo is blue crossed by red. The colors of the vestments given to Christ

1703. Part 1, p. 301, 302. (See Iconog. chret. Didron.p.228.
We give (1) a copy of that sculpture, singular but at the same time imposing. This Christ is clad in a long floating robe, folded in small plaits according to a very ancient oriental custom retained until our days. The breeze seems to lift the long folds of this robe. The mantle in nothing recalls the Greek or Roman mantle, neither in form nor in mode of wearing. The neck is bare; the sleeves of the tunic are wide, slightly divided at their ends and very open. As for the face of the Son of God, it presents a type entirely new then for the West. The eyes are slightly raised at their ends and are projecting; the cheeks are long and flat, the nose very delicate and straight, the mouth small with thin lips. The hair conforms to the description of Lentulus and the beard is short, sufficient, silky and divided in two points.

This type, perhaps one first introduced into France at the end of the 11 th or beginning of the 12 th centuries, must h have been regarded at that time as a remarkable work, for we see it reproduced, but by coarse artists, on the tympanum of the cathedral at Autun, some years later than the nave of Vezelay, then at the abbey of Charlieu, and finally in many secondary churches; but in such distribution it loses its Byzantine character and resumes something of the old Roman traditions. Evidently the native sculptors, while desiring to imitate these sculptures imported among them, could not entirely abandon the old methods and only modified them. This Byzantine art was not suited to the western peoples; it was too hieratic; the observation of nature, the need of imitation, of t truth, the love for the dramatic, must exert a salutary effect at first, deplorable when it falls into excess. Yet that introduction of a foreign art had a great result; it formed good workmen, for that figure of Christ of which a copy has just b been given, is executed with a very remarkable manual skill, as well as the rest of the relief; there is felt a complete art, although subject to a hieratic form. What was produced in France for sculpture war likewise produced for painting. The frescos of the abbey church of S. Savin near Poitiers, that dates from nearly the same epoch as the relief of Vezelay, denote pronounced Byzantine influence, at least in the representation of sacred personages; those still to be seen in the

sought to reproduce these features, this pure and thin countenance; they sometimes succeeded. In France until about the end of the 11 th century the representations of Christ are tolerably coarse, like all the western painting and sculpture before that epoch, impressed by Roman or Byzantine traditions, according to whether the schools of sculpture were subjected to one or the other of these two influences. Except some characteristic points, like the length of the hair, the bare feet, the cross-shaped halo, the gesture and the presence of some accessories, the book of the gospels or the globe, the figures of Christ do not present a uniform type; they are bearded or beardless, clothed in the simple tunic, long or double; t the mantle approaches the Greek mantle or the Roman toga. But at the end of the 11 th century, the rich French abbeys, that had freqeentlrelations with Lombardy, where had gathered a so school of Greek artists, and even with the East, invited to their monasteries painters and sculptors, who soon formed in France a school that excelled its masters (Art. Statuaire), and passed through a long and brilliant career. Those artists not only introduced among us the practice of art, but also t type forms already long consecrated in the East; types soon modified by Western genius, without entirely wandering from them. And to speak here only of the representation of Christ, we see on the internal portal of the celebrated church of Vezelay an immense tympanum in the midst of which is represented the Saviour in his glory, surrounded by the twelve apostles. That figure of colossal dimensions was evidentln executed under the inspiration of Byzant ne artists, if not by themselves. The attatude, vestments, the style nowise recalls the co coarse and heavy French sculptures preceding that epoch,inpressed by the last traditions of the Roman decadence.

Note 1.p.237. Discousse sur les types imitatifs de l'art chretien.

Note 2.p.237. Iconographie chretienne.

Note 3.p.237. Melanges archeol. Stained glass of Bourges.

Note 1.p.238. 'Eyes of blue." Perhaps meant as dark blue, sea blue (Ovid), wild (Horace).

Note 2.p.238. (Latin text). perhaps meaning; "But rather to weep."

Note 3.p.238. Codex apoc. Nov. Test., by Fabricius. Hamburg.

painted or sculptured representations of Jesus Christ, after the works of Ciampini, Eckel, Ducange, Bottari, Bosio, Agincourt, and the more recent ones of M. Raoul Rochette,[1] M. Didron,[2] of Revs. Martin and Cahier.[3] Before the epoch with which we are especially occupied, the representations of the Saviour vary; most ancient, those found in the catacombs in Rome and on Christian sarcophaguses, show us Jesus in the form of a young and beardless man, wearing the Roman costume, the head bare with long hair or encircled by a diadem or band, and holding in his hand the ancient book roll. Yet from a distant e epoch it is claimed that authentic portraits of Jesus Christ are possessed. S. John Damascene says that a tradition accepted in his time recognized a portrait of Jesus imprinted on a piece of cloth by the Saviour himself to satisfy the wish of Abgare, king of Edessa. During the first centuries of the Church was circulated a description of Jesus (apochryphal it is true), sent by Lentulus to the senate; this description by its antiquity, if by its more than doubtful origin, has no less a great value, for it is mentioned by the first fathers of the Church, and served as a type for the images later adopted by the Greek and Latin Churches. "This man," states the description attributed to Lentulus, "is of a tall and well proportioned stature; his countenance is severe and full of power, so that those seeing him can love and fear him at the same time. His hair is the color of wine, and to the roots of the ears, is long and without reflections. But from the ears to the shoulders it is curly and brilliant; from the shoulders it hangs on the back, divided in two parts according to the fashion of the Nazarenes. Brow smooth and pure, face without spot, tempered by a certain color. His appearance is modest and gracious, his nose and mouth are irreproachable. His beard is abundant, of the color of the hair and divided in two parts. His eyes are blue[1] and very brilliant. If he rebukes or blames, he is formidable; if he instructs or exhorts, his speech is amiable and persuasive. His aspect combines marvellous grace and seriousness. None ever saw him laugh nor even weep.[2] Of slender form, with long and beautiful hands and with charming arms. Grave and deliberate in speech, he is sparing of words. In his face, he is the most beautiful of the children of man."[3] All Christian artists of the middle ages

mass of buildingr. Now today with the aid of our very perfect instruments, this operation presents quite serious difficulties, does not always succeed, and errors are found when it c comes to the joining. The exact agreement of the old axis with the the new one is unity, while the chance of error is infinite. Thus we are disposed to think that these deviations of t the choirs of our churches come from errors, them inevitable, in laying out the monuments erected at two different times. If one could furnish us with only two examples of churches b built at one spurt, and in which the choirs are inclined toward the same side, we should be disposed to admit a symbolical r reason; until then we shall regard the opinion just stated as being most probable.

Perhaps it will be objected, that when the masters of works came to the rebuilding of the nave after having completed that of the choir, it was easy for them to correct their eeror and to prolong the axis of the sanctuary to make it the axis of the new nave. Certainly that would have been easy for them, if they did not have to retain the lod foundations, either to join them to the facadé already raised several yards, or finally admitting that neither old foundations were to be retained, nor the facade was to be respected, to keep within the lines of buildings nearly always attached to the walls of the church, such as cloisters, chapter halls, lodgings, and that it was desired to preserve because one could not do without them, even temporarily. Those structures that we admire greatly restricted the canons or monks, and there was necessary t the strong will of the abbots in the 12 th century, and of b bishops in the 13 th, and their soverign power, to conquer t the numerous objections, whose traces we even find today. Now all those called to direct constructions know what are the incessant difficulties, that arouse this opposition daily, whatever the firmness and will of the master. It is not surprising that the architects of the 12 th and 13 th centuries did not have entire freedom, and were frequently led by very wretched motives to errors and irregularities, that appear inexplicable to us today.

CHRIST. (JESUS). Christ.

We shall not attempt to give the history of the first pain-

the head of Christ on the cross, or a special orientation of the apse toward the East and of the facade toward the West. We shall not discuss these two opinions, which are based on our text, and that are more ingenious than probable; for by either hypothesis the inclina ion would always be directed t toward the same side, which it is not, and mediaeval writers, that speak at great length of the construction of churches, have not said a word of it.

We shall hazard our personal poinion, but without pretending to give it as solving the question; we shall say at first, that it is based only on practical and purely material observation. The churches that present that deviation in their axes were all built at the end of the 12 th or the beginning of the 13 th centuries; they were partly constructed on the sites of churches already existing; i.e., while retaining the nave to not interrupt the services, the choir was erected, or which is rarer, retaining the old choir, the nave was first rebuilt, as occurred for the cathedral of Amiens. It frequently happened, that in rebuilding the choir the western facade was erected at the same time, in order to give the faithful as quickly as possible an idea of the grandeur of the monument, and to encourage their efforts; or indeed for reasons of economy easily understood, they counted on using the old foundations, w when the nave was rebuilt after finishing the apse. These two successive operations, this joining did not present such great difficulties in laying out, especially at an epoch when no instruments of precision were available, suitable for laying o out edifices, or only cords or measuring rods could be used; then even the very imperfect instrument known as the surveyor's square was not in use. Besides it must not be forgotten that cathedrals as well as monastic churches at that time were surrounded by a number of accessory buildings, cloisters, treasuries, libraries and lodgings, that the bishops and monks retained as long as possible, since these buildings were used daily. On laying out a choir with the idea of later joining it to an existing nave or of rebuilding on the existing foundations, the master of the works could not place himself in d direct communication wit that second portion. He must close the portion of the edifice retained and locate his apse by me means of lines necessarily taken in the middle of the compact

is then necessary to assume that these images mentioned by D. Doublet were replaced on the rood screen of the 13 th century. The constructors of the 13 th century replaced in their monuments reliefs of an earlier epoch.

All abbey churches could not collect in their choirs such a great quantity of monuments, precious by art and by materials; yet they were rivals in zeal and care for decorating the religious enclosures. The choir of the abbey of Cluny was magnificent, the number of stalls considerable, the lights splendid. The sanctuary was surrounded by grilles and tombs forming the enclosure. That custom of employing the tombs as an enclosure for the sanctuaries is also found in many other abbey and cathedral churches, at S. Germain-des-Pres, the abbey of Eu, in the cathedrals of Rouen, Amiens, Limoges, Narbonne. The tombs of princes anf bishops protect the sanctuaries. (Arts. Cloture, Tombeaux).

The choirs of parish churches were first of all built for the faithful, the choirs were rarely enclosed except by open crosures of iron or stone, and the rood screens allowed the altar to be seen under arches borne by slender piers. Besides it does not appear that rood screens were very early erected at the entrances of the choirs of parish churches, while on the contrary at the end of the 15 th century and the beginning of the 16 th, rood screens were established before the choirs of these churches. (Art. Jube). We must not fail to mention to our readers the choirs of churches without side aisles, as for example the cathedral of Alby. In that case t the choir formed a church within a space left between that e enclosure and the radiating chapels; that arrangement is rare in France and is found only in some churches of the South.

Nearly all French churches, and particularly the great abbey and cathedral churches, present more or less pronounced deviation of therr axes at the junction of the choir with the transepts, nither to the north or south. Men have naturally sought to explain this peculiarity. The mediaeval author that could best give the reason, William Durand, who applies a symbolical meaning to each part of the church, does not say a word about it. Modern archaeologists have desired to see in that inclination given to the axes of choirs of churches, either a mystical representation of the inclination of the inclination of

tomb of Charles the Bald of enameled copfer, resting on four lions, and having at each angle one of the four doctors of t the Church. The pavement was magnificent, of white, black and verd antique marbles, jasper and porphyry; it was probably o one of those mosaics known in Italy under the name of opus a alexandrinum. At the southern extremity of the choir and beyond the crossing in the first bay of the sanctuary rose the altar of the Trinity, called the morning altar, of black marble enriched by figures in white marble representing the martyrdom of S. Denis; its stone reredos was covered by a magnificent reredos of gold at solemn festivals.(Art. Autel, Fig. 7).An iron grille was placed before the morning altar at the right of the two first piers of the apse, and formed the first and lower sanctuary. Behind the altar waseperceived the shrine of S. Louis, a work of silver and vermilion. At the two sides t two narrow stairs ascended to the upper sanctuary. Four columns of silver supported angels bearing wax candles accompanied those stairs,and served to suspend by means of curtain rods the veils of the morning altar. The upper sanctuary was enclosed by grilles of wrought iron, of which remain admirable portions. At the back of the apse the shrines of S. Denis and of his two companions were placed under a canopy of precious work, accompanied by a great front altar.(Art. Autel, Fig.6). Between the stalls and the altar of the Trinity, S. Louis caused to be placed a great number of tombs of princes, his predecessors, probably respecting the ancient places occupied by their remains. The tomb of Dagobert, a monument of great importance, likewise restored in the time of S. Louis, was placed beside the morning altar (epistle side). Opposite and later w were arranged the tombs of Philip V, of queen Jeanne d'Evreux, spouse of Charles the Fair, of Jeanne de Burgundy, of Philip de Valois and of king John. The magnificent monument of Charles VIII of gilded and enameled bronze,found its place on the same side before the enclosure of the morning altar.(Art. Tombeau).

Note 1.p.232. Hist. de l'abb. de S. Denis en France, by D. Doublet. 1625.

Note 1.p.234. Yet it is necessary to observe that the rood screen must have been rebuilt under the reign of S. Louis, t that the nave, the crossing and a part of the sanctuary. It

cathedrals, they did not equal in extent, in richly wrought furniture, in precious shrines and magnificent tombs the chors of the great abbeys. Among these abbeys that of S. Denis in France was distinguished above all, since the choir of its church served as the burial place for French princes. The plan of that choir and of the sanctuary is given in the history of the abbey of S. Denis by Dom Felibien; we content ourselves with tracing a cavalier view of it, which will make better w understood the principal arrangements of that venerated enclosure (2). Here as in all abbey churches the choir, properly so called, occupies the last bays of the nave, the crossing and one bay of the apse; the sanctuary is reached by four flights of 13 steps each, and two small ones at the sides of t the altar and two large ones in the two side aisles, extended into the apse over the ancient Carlovingian crypt.

Dom Doublet [1] will furnish us with the detailed description of all parts of the choir and sanctuary of the celebrated abbey church. The entrance of the choir was closed by the rood screen, on the front of which from the time of Dom Doublet w was still seen, carved in stone, the life and martyrdom of S. Denis, S. Rustic and S. Eleutheros. On the principal arcade rose the crucifix given by abbot Suger; the images of the Virgin and of S. John accompanied the cross. From the top of the rood screen on days of festivals was chanted the gospel. Dom Doublet says that formerly this front was covered by ivory fi figures intermingled with copper animals; he claims this as an admirable work given by Suger, and that the Huguenots destroyed it.[1] Before the anointing and coronation of queen Marie de Medicis, the choir of S. Denis however had suffered no important modifications. At the two sides 60 high and low stalls, richly carved and decorated by tapestry backs, were placed a against the piers of the nave. At the end of the stalls from one of the great piers of the crossing to the other a beam g crossed the choir; that was painted blue spotted with gold fleurs-de-lis; a cross of gold, claimed to have been made by S. Eloy, rose at the middle of its span. Between the stalls was a bronze lectern given by king Dagobert, and brought from the church of S. Hilary of Poitiers. That desk was supported by the four figures of the evangelists, also in bronze. Ascending toward the altar on the axis of the choir was seen the

enclosure was opened, so that scenes from the life of our Lord sculptured in the round were seen from within the choir as well as from the side aisles. Below that open part were reliefs r representing scenes from the Old Testament. It was impossible in any manner to see from the side aisles what occurred in t the choir and the sanctuary. At the sides of the entrance of the rood screen opening on the crossing were two altars according to custom. The choir was raised four steps above the pavement of the nave; at the end of the stalls came the sanctuary, elevated three steps above the choir, and beneath the crown of the apsidal vault was the high altar, whose form and c ceremonies have been preserved to us by a tapestry and an engraving. Behind the high altar was placed on a wide table of copper supported on four great pillars of the same material, the shrine of S. Marcel surmounted by a great cross, other shrines were arranged at right and left; behind the shrine of S. Marcel at the right side was the small altar of the Trinity, called the burning, on which was placed the shrine of Our Lady, containing the milk of the Holy Virgin and fragments of her vestments. Near the principal entrance of the choir was seen in the round the bronze statue of bishop Odon de Sully laid on a table of the same metal elevated about a foot above the level of the pavement of the choir. Odon de Sully in part contributed to the construction of the cathedral; under his episcopate was probably built the nave. At the middle of the choir and under the lectern were inlaid in the level of the pavement four tombstones, covering the remains of queen Isabelle de H Hainault, wife of Philip August, of Godfrey, duke of Brittany, and of two other unknown personages. Before the great altar and under the table of copper was the heart of Louise of Savoy, mother of Francis I. Other tombs were also visible behind the great altar of the time of Corrozet, among others being that of the celebrated Peter Lombard, archdeacon of the cathedral and prince; for in the choirs of, cathedrals were interred only bishops, princes and princesses. Beside the high altar at the north side, on a column of stone stood the statue of Philip August; at his feet was the tomb of black marble of Peter de Ordemont, who died in 1409.

Note 1.p.230. Art. Autel.

But whatever the richness and splendor of the choirs of cat-

livres in aid of making these stories (which decorated the e enclosure), and for new glass windows in the choir of the same."
The gift of the worthy canon indicates sufficiently, that the chapters believed in being enclosed.

The cathedral of Chartres erected a rood screen before its choir about the middle of the 13 th century; we do not know now whether from that epoch, it was surrounded by an enclosure; this is probable. The cathedral of Bourges built a stone enclosure around its choir after the end of the 13 th century. That of Paris also commenced to enclose its choir about the same epoch, the enclosure was scarcely finished, when bishop Mattifas de Bucycaused to be built a series of wide chapels enclosing the double side aisles of the apse. Did these enclosures thus require the construction of these chapels?

The enclosures prodoundly modified the primitive plans of the cathedrals whose choirs and not been arranged to receive them; they gave a novel appearance to the choirs, contrary to the spirit that directed the first constructors. Not being a able now to know what were primary arrangements of the choirs of cathedrals, men are obliged to adhere to those adopted an the end of the 13 th century; they are further coordinated w with the entirety, and in all parts are worthy of the object. Of all the choirs of cathedrals, that from which remains most precious data is the choir of the cathedral of Paris. We therefore give (1) a cavalier view of it, accombanied by a description borrowed from Gorrozet and Du Breuil. Beyond the crossing and between the two great piers of the transepts, a rood screen of stone closed the entrace of the choir. On the principal arch serving as doorway was a great crucifix; that work, says Du Breuil, was a masterpiece of sculpture; at the right and left of that arch joined the enclosure in painted stone 19.7 ft. high and representing the history of Jesus Christ, and of which a great part remains. That enclosure at the North and South sides served as a support for the backs of the stalls, that were of carved wood and crowned by a series of canopies. Two lateral doorways pierced in the enclosure gave entrance to the choir, that was reached from the side next t the colister by the red portal, and from the side next the p palace of the bishop by a gallery communicating with that. A Around the semicircle (sanctuary) the upper part of the enclo-

of the choir, which was then the honorable place; the officials seating themselves at right and left on benches according to their dignities, the latter nearest the sanctuary. That o order was also followed in the abbey churches; the seat of the abbot was at the back of the choir, that arrangement lending itself better than any other to the ceremonies.

Note 1.p.229. See Art. Herse in Dictionnaire du Mobilier.

Note 2.p.229. A beam placed across the choir and supporting torches. (Art. Trabes).

During the second half of the 13 th century, either the bishops renounced the retaining of vast halls suitable for popular assemblies, or the chapters found themselves too much exposed in choirs accessible in all parts, and there were established rood screens before the choirs and soon afterwards high enclosures, entirely closed and protecting the rows of fixed stalls fitted with high backs and canopies, canons were thus by themselves in the cathedrals, just as the cloistered religious were within their monastic churches. But still it was necessary in cathedrals for the faithful to be present at the offices, not being able to see the ceremonies occurring in t the choirs enclosed on all sides; then were erected in episcopal churches those numerous chapels around the side aisles of choirs and even along the walls of the nave. (Art. Cathedrale). The dominant idea that inspired the bishops at the end of the 12 th century, when they set themselves to building on new p plans, was thus abandoned when they were scarcely completed, and in less than a century most choirs of these great churches were enclosed, the ceremonies of the worship being withdrawn from the eyes of the faithful. We do not undertake to seek or to explain the causes of this change. We content ourselves wi with mentioning the fact, that if we are not mistaken, must be connected with the disputes arising between the bishops a and their chapters, discussions at the end of which the bishops must yield to the wishes of the canons, particularly interested in enclosing themselves.[3]

Note 3.p.229. "Along the enclosure of the choir of Notre Dame going toward the East," says Du Breul, "is seen the figure of an ecclesiastic ornamented by a dalmatic, beside which is inscribed:--"

Master Pierre de Fayel, canon of Paris, gave two hundred

choir," says he,[1] "are the dorsals, the carpets laid on the pavement, and the decorated benches. The dorsals are fabrics suspended in the choir behind the backs of the clerics." [2] Further concerning the festivals of Easter, he says;[3] "The churches are appropriated and their walls are hung with tapestries. Seats are placed in the choir, hangings are displayed, and the bans are arranged there.[4] The altar is decorated by all its ornaments; in certain of these are banners designating the victory of Jesus Christ, of the cross and other relics.

Note 3.p.228. Book 6. Chapter 90.

Note 4.p.228. These did not then occur at the dwelling.

In all primitive cathedrals the place of the bishop is at the back of the apse and on the axis; those of the officials assisting the prelate, when he said mass, were at right and left in a semicircle; that arrangement justified one of the etymologies given to the word choir (corona); then the altar was only a table without reredos and placed between the clergy and the lower choir where sat the canons and clerics; then come the laymen ranged in the transepts and nave, women at o one side, men at the other. That arrangement was retained in some cathedrals until about the middle of the last (18 th) century, among others at Lyons as stated by lord Mauleon in h his Voyages liturgiques. At one end of the semicircle of the apse on the epistle side sat the celebrant priest, who had b beside him a desk for reading the epistle. The officiant at the altar faced the East. Behind the great altar and surrounded by a balustrade was a smaller altar. From that altar to the back of the apse, where was placed the throne of the archbishop, remained a large free space at the middle, and where was placed on a sort of desk the cope for the officiant, and beside it the chafing dish containing coals for the censings. Before the altar and between the lower choir and the sanctuary was placed a great candlestick with seven wax candles,[1] which thus replaced the beam of the primitive churches. But the apse of the cathedral of Lyons is without a side aisle. The arrangement of the choir and of the sanctuary must be entirely different in churches with apses accompanied by single or double side aisles, like those of our great cathedrals of the N North. Then the high altar was placed at the centre of the s semicircle, and the bishop present took his place at the back

ceremonies. The choir of the religious, placed between the c crossing and the last bays of the nave, was closed by a rood screen at the entrance, and woodwork, grilles or lateral walls extended to the sanctuary. The presence of the believers in the monastic churches was only accessory, and the religious enclosed within the choir were not, and could not be visible from the nave, the faithful heard their chants and saw the clerics ascend the rood screen and read the epistle and gospel, but could only see the altar through the gates of the rood screen, when the veil was drawn. In the monasteries of the 11 th and 12 th centuries the religious were very numerous, and their churches were built for them; the believers must go to the parish church and to the numerous chapels surrounding the monasteries to attend divine service. There were always then in those monasteries a great number of strangers, pilgrims, refugees, for whom the nave of the church was reserved, who spent there a great part of their time, and sometimes even re remained there day and night. It then became necessary to close the choir of the religious. This programme was not suitable for parish churches and still less for cathedrals.

Cathedrals (Art. Cathedrale), when nearly all rebuilt in France at the end of the 12 th century, had a character both r religious and civil; there nothing obstructed the view, except that the altar was surrounded by veils. In constructing them on vast plans, the bishops on the contrary desired to offer t to the inhabitants of the great cities wide areas in which t the ceremonies of the worship and even the civil assemblies c could extend at ease. It should not be forgotten, that the c cathedrals of that epoch were erected in a spirit opposed to the monastic spirit, to attract and assemble the inhabitants of polulous cities around their bishop. The bishops desired religious festivals to be the festivals of all. Thus the choirs and sanctuaries of cathedrals rise only two or three steps above the pavement of the nave; the transepts are left to the faithful, the wide aisles surrounding the apses are nearly always on the level of the choir, separated from it only by an enclosure. The view extends on all sides and access is easy.

Again from the time of William Durand to the end of the 13 th century, it does not appear that choirs were generally surrounded by fixed stalls and enclosures. "The ornaments of the

may be seen at Blois and at Chambord. That custom was retained after that epoch; the interlaced cipher of Henry II and of C Catherine de Mediciscover the friezes and panels of the Louvre, as well as those of Henry IV and even of Louis XIV.

CHOEUR. Choir.

The part of the church in which sit the canons, religious or clerics to chant. The interior of churches is divided into five distinct parts, the narthex, vestibule or porch, nave, transepts, choir and sanctuary. In French monastic churches the choir of the religious ordinarily extends into the nave. An altar was placed beyond the transepts; before this altar were chanted matins and lauds; behind the morning altar rose the sanctuary, that occupied the entire space between the transepts and the chevet. In cathedrals and parish churches the choir ordinarily commences beyond the transepts and the altar is placed at the back of the apse in the sanctuary, which occupies the semicircle. "The choir of the clerics," says William Durand,[1] "is the part where they gather to chant in common," and he adds; "where the multitude of the people is collected to be present at the holy mysteries," which makes his definition quite vague; unless by supposing (which is possible), t that he meant by choir not only the space reserved for the c clerics, but also the side aisles of the apse in which were placed the faithful.[2] But it is necessary to make known here what were the choirs of churches, whether monastic, parochial or cathedrals, in the different epochs of the middle ages.

Note 1.p.227. Rational. Book 1. Chapter 1.

Note 2.p.227. (Latin note).

The arrangements that now seem to us most easily found are those of the choirs of monastic churches, because until the end of the last (18 th) century, they suffered less alteration than those of other churches. All abbeys possessed holy b bodies, venerated relics deposited either in the crypt under t the sanctuary or in the sanctuary itself, as occurred at S. Denis in France. As we have just stated, this sanctuary commenced at the eastern opening of the crossing, and was frequently raised several steps above the floor of the transepts. The faithful were admitted to the interior of the sanctuary only at certain festivals, on the occasion of extraordinary

Note 1.p.224. Example taken from houses of Flavigny.

..e sees at Chaumont many houses with gutters so arranged,: and that custom has continued until our days. Architecture is only an art when it knows how thus to conquer difficulties, to foresee and protect by simple and true means, easy of execution in the humblest house as in the palace; but when on t the contrary, it has recourse to artificial means, that demand the aid of very fully developed industries, extraordinary workmanship and much expense, it can succeed where all resources are at command, but it abandons to barbarism localities distant from great industrial centres. This is what occurs; today outside the great cities in which the discharge of rainwater is managed with much skill in private houses, everywhere negligence, ignorance and lack of care allow us to see how those ancient constructors were more skilful, wise and scrupulous, than the builders of our time, without causing their clients useless expenses.

CHEVET. Chevet. Apse.

Name given to the extreme position of the apse of a church. (Arts. Abside, Cathedrale, Eglise).

CHIFFRE. Cipher. Monogram.

By this word are designated the initials of proper names c carved or painted on monuments. It does not appear that the ciphers of living persons were admitted in the decoration of edifices before the 15 th century; but from the end of that century, ciphers are frequently carved on friezes, walls, balustrades, or painted in stained glass windows and on the internal walls of churches, palaces and houses. The balustrade of the western gable of S. Chapelle of Paris was rebuilt by Charles VII, and is composed of fleurs-de-lis within quatrefoils, in the middle of which rises the crowned K (Karolus) supported by two angels. The balustrade of the oratory of the same chapel built by Louis XI is likewise ornamented at the middle by the crowned L detached on an opening with fleurs-de-lis. The old mansion of the Cour des Comptes at Paris built by Louis XII was covered by ciphers, crowned Ls, porcupines, dolphins, hermes and fleurs-de-lis. Crowned Fs are found on the structures undertaken by Francis I. A great number of these

of the roofs into the street.[2] Two reasons contributed to cause the gutters to be established at the base of the roofs, t the need of collecting rainwater in cisterns (many cities were built on localities without water), and the inconveniences c caused by water falling from the roofs on the public way. But as the great majority of urban habitations were of very simple construction, one could not bear the expense of a crowning g gutter of stone at the edges of the roofs. The constructors of houses contented themselves with setting stone corbels at the tops of front walls, placing on these corbels a hollowed and inclined wooden member forming a gargoyle at one end. Fig. 6 will explain that naive arrangement.[1] These gutters are applied to houses with eaves of the roofs on the street; but if the gables are on the public way, as generally practised from the 14 th century, the gutters were arranged perpendicular to the street. At that epoch of houses rarely had party walls; each house possessed its four walls, and there existed between the houses a very narrow alley.'Art. Maison). Each habitation thus had its separate gutters, that most frequently were made of the hullowed trunk of a tree projecting beyond the gable a and forming a gargoyle as indicated in Fig. 7. These wooden gutters were sometimes mouldings, even carved and painted in different colors, art always intervening in the entirety as in the details of the most common structures. These arrangements of gutters applied to houses were not the only ones. In provinces rich in calcareous materials, like Burgundy, Haute-Marne and Oise, gutters of stone were employed by preference to those of wood, and these stone gutters are placed so as to avoid all leaking through the joints along the surfaces; at first they always project, so that the roof covers the top of the walls and preserves them from all dampness; then corbels are set in the wall under each joint of the gutter,and are hollowed out in the form of a gargoyle; then if these joints opened or lost the cement closing them, the water fell into the corbel-gargoyle, and was cast outside far from the surfaces. Fig. 8 will dispense with lengthy explanations on this subject.

Note 2.p.223. Not more than 25 years sence at Paris the roofs of most houses were still without gutters. During rain storms, the water found a sheet of water before facades, and rendered passage impossible, even with umbrellas.

Picardy and Normandy, these channels led to lead pipes skilfully placed in the construction. (Art. Conduite).

Note 1.p.220. This roof was less steep than the existing one, which dates from the beginning of the 13 th century, and that was rebuilt after a fire not mentioned by history, but whose traces are visible on the monument itself. The choir of Notre Dame of Paris was entirely completed in 1177 excepting the r roof, as stated by the chronicle of Robert, abbot of Mt. S. Michel, and from which M. Alfred Rome has courteously sent us the following curious extract. (Latin text).

Note 2.p.220. This example is taken from the western facade of the cathedral of Paris.

Note 1.p.221. It is necessary to observe, that already at the beginning of the 13 th century, the roofs of the cathedrals of Paris and Chartres were covered with lead, the gutters there at least not having to stop the fall of slates or tiles.

Stone gutters placed at the base of the roofs during the 13 th aod 14 th centuries are generally hollowed with flat bottoms, i.e., to havi in section the profile here given (3); the joints are made with care and have a groove A in which is sometimes cast lead or a very hard cement composed of pounded sandstone and litharge. These gutters are from 1.0 to 1.6 ft. wide. They are cut in the hardest stones that can be procured, and it has seemed to us, that their cavity for receiving the water, carefully cut or even polished, was frequently treated w with some fatty material,(perhaps linseed oil and litharge). We have even seen some of these gutters, that were coated with a thin cement, very hard and adherent to the stone; to make this cement hold, the stonecutters out little grooves across the gutter, particularly at both sides of the joints, as shown in Fig. 4,[1] or sunk at the joint itself a groove, that allowed the cement to be cast in it.(5).

Note 1.p.223. Thus were established at first the gutters of S. Chapelle at Paris.

The gutters of the great edifices of the middle ages from the 13 th to the 15 th centuries present four varieties; the systemadopted continues without notable differences. It is not the same with the gutters of private houses; these are very varied in arrangement and form. They appeared only in the 13 th century; until then the rainwater fell directly from the eaves

rail, but being composed only of little isolated columns set on the very edge of the cornice, the water of the gutter ran between these little columns on the slope of the drip. Yet t these means only diminished the inconveniences resulting from the eaves of the roofs, but did not avoid them, since the rainwater continued to drip for the entire length of the cornice; they already rendered the work of the roofers easier, and stopped the tiles or slates, that slipped on the slope of the r roofs.[1] Only from 1225 to 1240 these projecting gargoyles were fitted to gutters to distribute rainwater in a regular manner and at certain points of the edifices. In churches with side aisles the water from the gutters about that time was led on the copings of the flying buttresses, then cast outside by g gargoyles of stone placed at the ends of the slopes of these flying buttresses. The rainwater fell from the upper roofs, and thus reached the external soil by the shortest way. But these flying buttresses, designed to abut the thrust of the vaults, did not reach the level of the upper cornices; men at first attempted to cast the water from the gutters of the great roofs by gargoyles into gutters forming the coping of the flying buttresses; and although the the distance between these copings and the upper gargoyles was not great, yet the wind sent the water to right or left of the copings; soon were established pipes of stone connecting the upper gutters with t the copings. Even frequently these stone pipes were lined with lead pipes.(Art. Conduite). Then later toward the end of the 13 th century were removed the stone pipes, that were subject to obstruction and to cause leaks into the walls, and on the flying buttresses were formed stone ecqueducts intended to support the inclined gutters. (Arts. Arc-Boutant, Construction). The inclined channels found on the copings of the flying buttresses reached the pinnacles surmounting the tops of the buttresses, and originally passed through these pinnacles to discharge by gargoyles. It was not long before perceiving that these channels passing through the masonry could never be dry, that they were obstructed and caused leaks into the mass of the buttresses, then about the middle of the 15 th century the method was adopted, to turn the channels beside the pinnacles, and thus bringing uncovered water to the gargoyles at the ends. Even sometimes in the provinces of the North, in

architects, they were led to diminish more and more the thickness of the walls and even to entirely omit them. Then they adopted the mode of making the gutters independent of the construction by making them project beyond the cornice on arches, or indeed to support the carpentry on the side arches of vaults turned at a certain distance inside the wall, and to set the gutters on the space remaining between these side arches and the external wall, then reduced to a small thickness. This last system was applied in Burgundy and Champagne. In Ile-de-France, a sufficient projection was given to the cornices to be able to run the gutter at the base of the roof. We notice in the high part of the choir of Notre Dame of Paris the transition from the system of Romanesque eaves to the system of gutters placed on projecting cornices at the base of the roofs under the parapet wall. At the origin, i.e., from the time of Maurice de Sully (1160 to about 1180), there existed no gutters at the base of the great roof.[1] The top receiving the carpentry consisted of a cornice of little projection, composed of four rows of squares on which was placed a moulding forming the upper round. About 1220, probably after the fire before mentioned, when already at Paris Gothic architecture had assumed its complete development, there was removed from the cornice of Maurice de Sully only the upper round, leaving the courses of squares, and above was placed a cornice composed of crocket leaves and a drip moulding; the whole presenting a s strong projection. This drip was hollowed in form of a gutter, whose slopes send rainwater into great gargoyles placed above each flying buttress. As for the new carpentry, it rests on a parapet raised about 4.3 ft. above this gutter, and a stone b balustrade was fixed on the coping of the gutter. (Art. Bahut, Fig. 1). About the same epoch, in the cathedral of Chartres a and on the facade of Notre Dame of Paris were also placed drips forming gutters but without gargoyles; the water simply ran off through holes arranged under the balustrade at certain distances, as indicated in Fig. 2.[2] This arrangement explains why on the facade of Notre Dame of Paris, the drips of the different stories bearing gutters have such strong projections; because they were intended to cast from the surfaces the water from the gutters, like a continuous drip moulding. At Notre Dame of Chartres, the balustrades having no lower

very apparent in Norman edifices. Those gutters (1) are generally very deep; yet on arches projecting from the face of t the walls, their voussoirs spring from the tops of abutments, and are surmounted externally by an inclined acroteria composed of several courses, as indicated by the section A. One c can only explain the extraordinary height of this outside gutter as a guard intended to prevenh tiles or slates from falling on the public way, when detached from the covering, and to contain the snow that slides down the slopes of the roof. We find gutters analogous to these above the triforium of the choir of S. Etienne at Caen, and that are of a date a little later. The apsidal chapels of the upper church of Chauvigny near Poitiess, that date from the first half of the 12 th century, likewise possess acroterias forming a gutter above the cornice. Gargoyles of slight projection or simple holes pierced at certain distances, cast the rainwater outside. In Ile-de-France, Champagne and Burgundy, gutters only appeared in the 13 th century. But the arrangement of the first gutters of that epoch requires some explanation.

Note 1.p.219. The example given here is taken from the apsidal chapels of the cathedral of Rouen (end of 12 th century).

Although the walls of Romanesque edifices were very thick, the carpentry of the roof presents slopes inclined at an angle rather more than less than 45° degrees; the feet of this carpentry then require a wide bearing (Art. Charpente), and the ends of the rafters as well as the battens and tiles reach t the edge of the cornice, otherwise projecting little; there remained no space for placing the gutter at the edge of the roof, and the water fell directly on the ground or the lower roofs. Men recognized the inconveniences of this primitive s system; the water so discharged along the surfaces changed them, retained dampness at the base of the walls,and destroyed the foundation; if a tile slipped it fell on the head of the passer or a lower roof; in the last case it broke a great number of tiles and made a hole in the roof. If one was under the necessity of repairing the covering, the roofers not being able to rest their feet of their ladders anywhere, risked sliding off with them, or at least made considerable damage in placing these ladders on the covering itself. Yet by reason of the new system of construction employed by Gothic archite-

of chimney caps; they often decorated them by a luxury of mouldings and sculptures tolerably exaggerated. If it be well t to not disguise a secondary need, but to profit by it to decorate an edifice, yet it is unnecessary for an accessory to take more importance than is proper, and thus lose its actual character. This moderation, so perfectly observed by the architects of the middle ages, was not the task of those of the 16 th century, and the latter came to give chimney caps above the roofs such importance, that it is often difficult to know what is contained by these enormous stone piers, covered by little columns, pediments, panels and sculptures. The chateaus of Chambord, Blois, Ecouen and so many others present a quantity of these massive caps covered by ornaments, which at a distance destroy the principal lines of the roofs, and resemble the ruins of some colossal monument.

Under the reign of Louis XIV, men fell from one excess into a worse one; the return to what was then believed to be Roman architecture suppressed visible gables and consequently chimney caps. But since in France warming occurs six months in t the year, it was necessary in all cases to surmount the acroterias and antique terraces of edifices by horrible chimney caps of brick, plaster and sheet iron. In recent times, men have returned to more reasonable principles, and architects do not fear to show frankly on the exterior the caps of our chimneys.

CHENEAU. Gutter. Eave Gutter.

This is the name given to a conduit of stone, terra cotta, wood or metal, that receives the water from the roof and by gentle slopes guides it to the outlets arranged in the construction of the edifices.

The monuments of pagan antiquity from a very early epoch p possessed gutters at the eaves of the slopes of roofs. The t temples of Magna Grecia and of Athens had gutters.of terra cotta, stone or marble with outlets opened at regular distances. Gutters are likewise found in Roman monuments. Yet they disappeared in France during the Romanesque period. The roofs allowed the water to fall directly on the ground. We scarcely s see the gutter reappear in north France until about the middle of the 12 th century. From the end of that century they are

action of soot.

The old chimney cap of the great hall of castle Sully-sur-Loire has been unused since the 16 th century by reason of a change of the internal arrangement, and it is retained with its wrought iron crown as shown in Fig. 19. This flue is given in horizontal section in the plan A. the top of the gable of the hall serves it as a cap.

The castle of Du Guesclin at Beliere near Dijon has retained several charming octagonal chimney caps in granite, brick and slates, two examples of which we give (20), that date from the end of the 14 th century. The horns B decorating the crowns are of thick slates fixed in grooves in the upper courses of granite forming the caps. The grounds of the little a arcades C are of slates, which by their dark color strongly detach the fine ornamentation, and allow it to be seen at the height at which it is placed.[1]

Note 1.p.214. M. Ruprich Robert has courteously communicated to me these precious data.

One of the most remarkable qualities of the architecture of the middle ages is to have known how to use all the most common accessories of the construction to make them a motive of decoration. New needs developed as soon as the architects, f far from concealing them, on the contrary sought to give them an art form, not only in structures erected with luxury, but also in the humblest habitations. We find the proof of this in a great number of old houses of our old cities. With the simplest and least expensive means, these architects have obtained elegant forms perfectly appropriate for the needs they must satisfy. In the cities of the East still exist many chimneys with caps formed of a structure of tiles held by mortar, which are outlined against the sky in the most graceful fashion.

Fig. 21 presents three examples of these chimney caps of w which so many are seen at Strasburg.[1] The balls A surmounting the tiles are set in mortar. Still today at Strasburg is preserved the tradition of this construction of the 14 th and 15 th centuries.

Note 1.p.214. M. Potoueille, architect, furnished us with these sketches of Strasburg caps.

The architects of the chateaus of the epoch of the Renaissance even improved on their predecessors in the construction

several stories of the same building, men avoided placing them over each other, they alternated or were opposed, so as to 1 leave each flue isolated; while from that epoch, the use of fireplaces being much extended, men wished not only to have them in all important rooms, but even to place them over each other; henceforth the towers and gable walls of houses received two, three or four chimney flues set beside each other. It was necessary to have a flue for each fireplace and to separate them by partitions; these constructions were executed with great care. Instead of being cylindrical internally, the flues in this case have horizontal sections of much elongated parallellograms separated by partitions 4 to 8 ins. thick.Thesasaresbuilttthe flues of the three superposed fireplaces in the keep of Pierrefonds, that we give in (18), at P being the vertical section and at A the horizontal section at the level A′. The partitions B B′ are of stone well faced and cut. At C, C′, C″ are several small rectangular recesses to receive the place to cast iron of the back, designed to prevent the heat of the hearth from calcining the stone and from destroying the partitions. Frequently by an excess of precaution above the plate the partition is cut as a lintel or discharging arch as seen at D. At F we give the caps of these chimney flues, surmounting the gable of the building; at G is their plan at top and H is their frofile. One sees at I that the projecting band found in the courses of the shaft, designed to cover the inclined sides of the roof above the slates. This band t takes the place of the band of plaster,and continues under t the steps along the rake of the gable, allowing one to reach the caps easily to repair them, and to receive defenders protected by the battlements K lookink outwards. But in locations exposed to great winds, the chimneys terminating abruptly by openings without caps, did not readily allow the smoke to escape; that was forced back by the wind, compressed and returned to the interiors of the apartments. To avoid that inconvenience, the top openings of flues were fitted with caps in perforated iron sheets, that divided the external air anf permittel the smoke to escape.freely. We have seen on many chimney caps of the 14 th and 15 th centuries traces of anchors, that indicate the presence of these crowns; but there exist very few, that have resisted the storms and the corrosive ac-

stories with a cap in form of a lantern covered by a cone. We give an elevation of it.(14). Very rarely at that primitive epoch fireplaces are superposed, so that the flues are single or separated. But the fireplace of Puy is relatively small; when fireplaces had considerable dimensions, and must heat L large halls and have very large hearths, a passage for the s smoke must be given according to these dimensions. There existed before 1845 at the abbey of S. Lo an enormous fireplace, from the beginning of the 13 th century, whose chimney was a real monument, an octagonal turret 3 ft. in diameter outside. This chimney, whose elevation is given (15) passed from the square to the polygonal form by four slopes, and terminated in two stories of little columns, the last of these being o open with a high pyramid.[1] There exists on a house near the cathedral of Bayeux a chimney of smalles dimensions, that recalls that of the abbey of S. Lo. These chimnies are entirely closed at top; the smoke could thus only escape at the sides. In the 13 th century, chimney caps are frequently open at the sides and the upper end. Here is an example from the abbey of Fontenay of the order of Citeaux (16). To prevent the rain f from falling within the flue, the upper orifice is very small. This cap is made of hollowed drums of stone like that of Puy-en-Velay. Often in buildings of the 13 th century the caps a are only open at their ends, and continue to take the cylindrical or prismatic form. Examples of these sorts of caps are very numerous; there still exist some in the buildings of the palace at Paris; we know quite a remarkable one preserved in the rins of the castle of Semur in Auxois with moulded base a above the chimney extended from the roof.(17).

It is necessary to mention here an important point in the construction of that accessory; the shafts projecting from t the roofs always have a projecting band of stone forming a g gutter under the tiles or slates at A and a coping B above t the sides and lower part of the shaft, to prevent the rain from running along the tiles on the exterior and entering beneath the covering. These are precautions in detail, that emphasize the extreme foresight and the care of the constructors of the middle ages, precautions now much neglected. But u until the 14 th century, even in great civil or monastic structures, fireplaces are rarely superposed; if provided in se-

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executed that fireplace feared to impose by it, he took care to imitate on the hood a vertical and a horizontal rope, that seems to connect it together, as if to indicate its fragility and its defective connection with the wall.

The other fireplace of S. Antonin is constructed in the same manner, but it is covered by a profusion of ornaments carved in the plaster and by mouldings. On the hood two angels hold a shield of arms. Two other shields set at each side against the wall, likewise bear arms and are spported by angels. These last shields appear to bear on the field adzes as instruments of the trade. A rope stretched with a stick and held by two figures appears to support the base of the hood, and a c chain retains its upper part. Here (13) is the perspective o of this fireplace.

The epoch of the Renaissance saw arise beautiful fireplaces in the interiors of chateaus; their jambs and mantles were decorated by sculptures and paintings of rare richness anf elegance; several of these fireplaces exist in some chateaus, at Ecouen, Fontainebleau, in the manor of Ronsard near the market town of Coutures, in the hall of the city hall of Paris. The museum of Cluny possesses one of precious workmanship, that came from Mans, and everyone knows the magnificent fireplace of Bruges. But soon the enormous dimensions given to fireplaces were reduced, and already during the 17 th century, t they assumed less grand proportions. Marble replaced stone, which until then had been employed in the construction of jambs and mantles of fireplaces, and these mantles were successively lowered to the height of a window sill.

TUYAU ET MITRES DE CHEMINEE. Chimney Flues and Caps.

The smoke flue of the 12 th century is ordinarily cylindrical internally and terminates above the gable or roof in the form of a great column crowned by a cap. Besides being constructed with great care by means of hollowed stones, these stones frequently take a monumental form, that crowns the ridges of edifices in graceful fashion. The fireplace of the precentor's house of the cathedral of Puy-en-Velay, a drawing of w which was given (Figs. 1, 2), above the gable of the hall against which it is built, is terminated by a beautiful cylindrical chimney composed of alternate courses of black and red

at Bourges contains quite beautiful fireplaces of the 15 th century; one of those preserved represents a crowning of the castle with battlements, machicolations and dormers; between the battlements are little figures; some draw the bow or cross-bow, others play the horn and bagpipe, yet others throw stones, hold standards, etc. This fireplace is 5.3 ft. under the mantle by 6.9 ft. wide. But the most interesting of the fireplaces in that mansion was that representing a burlesque tourney, only fragments of which remain, placed in the archives of the mayoralty. On the mantle were sculptured peasants mounted on donkeys with sticks for lances, bottoms of baskets for shields, and running over the lists. Jacques Coeur had little cove for the feudal nobility of his time; did he wish to have under h his eyes that caricature of one of the most common diversions of the lords of the court of king Charles VII? Or was that a fancy of the sculptur? Whatever it might be, it is much to be regretted, that this precious monument was destroyed.

Note 1.p.205. Hist. du dioc. de Paris. Vol. 12. p.53.

In the habitations of the citizens of the 14 th to the 15 th centuries, fireplaces are decorated with luxury as for the nobles, but in more restricted proportions and according to the dimensions of the rooms. Sculpture on stone was dear, and as in our days, the citizen often wished to seem at little cost; so many fireplaces of private houses were of wood, visible or covered by carved and moulded plaster. One still finds in several provincial cities some examples of these foreplaces preserved in spite of their fragility; we have seen several at Toulouse in houses recently demolished, in the vicinity of the place of the capitol; and there exist two precious ones, because of their perfect preservation, in the little city of S. Antonin, formerly industrious and rich, now reduced to the condition of a market town. These two fireplaces date from t the 15 th century; the simplest is given here (11) and consists of two stone jambs and a mantle formed of a wooden frame covered with plaster, moulded and carved.

Fig. 12 gives at A the section and at B the plan of that c construction. Detail C indicates a portion of the covered frame forming the hood and the mantle of the fireplace. The dotted lines on section A show the general arrangement of that framework. By . feeling of modesty, and as if the artist who

flank the external angles of the hall. The fireplace is divided in three parts; three flues lead from the hood, and passing behind a glazed opening, rise to the apex of the gable w wall. The entirety of this decoration produces a great effect and nobly terminates this beautiful hall, whose clear width is 53.5 ft.

We give (9) at A the plan of the fireplace of the great hall of Poitou at the level of the hearth, and at B the plan of the upper part of the gallery placed on the mantle, taken at the level of the glazed openings. Its hearth is raised ten steps above the floor of the hall; the fireplace thus forms the base of the tribunal. Fig. 10 presents its general elevation. The two piers that divide it into three bays are terminated by c capitals richly sculptured and decorated by shields borne by angels. The mantle is ornamented in the same manner.[1]

Note 1.p.208. M. de Merindol, diocesan architect of Poitiers, was very willing to furnish us with the drawings of this fireplace, made with scrupulous accuracy.

In the interior as well as on the exterior of civil monuments, the middle ages knew how to produce grand effects, that leave far behind the mean arrangements of our largest modern edifices. When they sat on that platform in their grand costumes, the counts of Poitiers were surrounded by their officers; when behind that feudal court gleamed these fires kindled on three hearths, the assistants being seated on a bench above the mantle of the fireplace with their backs to the glass, c completing that representation, one can conceive the nobility and grandeur of such a scene, how it must inspire respect in the vassals cited to appear before the court of the count. Certainly to defend his cause before a tribunal so nobly seated and surrounded, it was necessary to have threeefold reason. But we shall have occasion to return to the arrangement of t the feudal tribunals under Art. Salle, to which we refer our readers.

The castles of the 14 th and 15 th centuries still possess a great number of fireplaces of small dimensions in the towers and private apartments. These fireplaces are often skilfully arranged to ward two rooms. Lebeuf [1] states, that he saw in the keep of the castle of Montlhery, "a fireplace so constructed as to serve four rooms." The mansion of Jacques Coeur

at the mansion of Cluny, Rue des Mathurins (this fireplace no longer exists), without speaking of that of the great hall, that is embarrassed by an infinity of pilgrims of all heights, who go on pilgrimage in a wood beside a high mountain."

Note 1.p.201. Hist. et antiq. de la ville de Paris. Vol. 2. p. 279.

The great hall of the castle of Coucy contains two likewise presenting the peculiarity that these fireplaces are separated by a stone partition, so as to cause two drafts. A jamb divides the span of the mantle and thus forms twin fireplaces. The same arrangement was adopted in the construction of the fireplace of the hall of the hall of Prussians dependant on this castle. The drawing of this beautiful fireplace is preserved to us by Du Cerceau,[2] and we reproduce it here (8). On the mantle of this fireplace were sculptured in the round in colossal dimensions the statues of the nine Prussians,[3] each bearing a shield on which was engraved an attribute.

Note 2.p.201. Plus excellents bastiments de France.

Note 3. Of these figures remains only a head recently discovered. We do not despair of finding other fragments of this magnificent fireplace.

Everything leads to the supposition, that men had recognized in constructing fireplaces of very great width the necessity for dividing the draft into several portions, to prevent the wind from being engulfed in these wide openings, thus driving back the smoke. But forming several flues, more activity was given to the draft, and thus the smoke could more easily escape; these divisions again had the advantage of giving strength to the walls separated by the flues,by joining their two external and internal surfaces.

The beautiful fireplace of the great hall of the palace of the counts of Poitiers gives us a very remarkable example of this system of divided flues above a single mantle. This fireplace dates from the beginning of the 15 th century,as well as the gable wall against which it is built, occupies almost entirely one end of that hall, whose construction dates from t the 13 th century; it is not less than 33 ft. wide by 7.5 ft. under the mantle. The top of the mantle forms a sort of gallery reached by two stairways pierced in the angles of the gable; these two stairways themselves connect with two turrets, that

same time whole beeves and sheep; these are halls comprised within the buildings and furnished with one or several fireplaces. The kitchen of the palace at Paris was in two stories, possessing a central fireplace in the upper story and four in the lower story.[1]

Note 1.p.200. Art. Cuisine. This construction is later than the reign of S. Louis, and appears to belong to the end of t the 13 th century or the beginning of the 14 th. See what Sauval says of it in his Hist. et antiq. de la ville de Paris. Vol. 2. p. 280.

There still exists in the castle of Clisson near Nantes one of these kitchens dating from the first years of the 14 th c century, and which consists of an enormous fireplace, whose mantle is formed of two semicircular arches and occupies the half of a vaulted hall. The abbey Blanche of Mortam has retained a beautiful kitchen fireplace of granite, of which we give a perspective.(7). The arms of the abbey are carved on t the keystone of the mantle, composed of two enormous corbels and three voussoirs with indents. There are no jambs here to support the mantle, but two strongly projecting corbels. The back is still furnished with its cast iron plate and its triple pot-hooks.

But until the 14 th century, the fireplaces of the castles and houses, with rare exceptions, were very simple, like everything for daily use. The luxury of interiors consisted in paintings, woodwork and more or less rich hangings, according to the state of the fortune of the master. Only rarely during the 14 th century do we see sculpture and reliefs invade the mantles of fireplaces. At that epoch the great halls of castles were mostly rebuilt in larger proportions, and were furnished with several fireplaces. The great hall of the knights of Mt. S. Michel-en-Mer contains two fireplaces; that of the castle of Montargis contained four, two at one of the longitudinal walls and two at the ends. (Art. Salle).

"The fireplace of the king's chamber at mansion S. Pol," s says Sauval,[1] "had great stone horses for ornament; that of his chamber at the Louvre in 1365 was charged with 12 great beasts and 13 great prophets, each holding a scroll; further terminated by the arms of France, supported by two angels and covered by a crown. There is still a fireplace in that style

open two low windows with stone tablets above to receive torches at night. The back is of brick inside, of stone externally; the hood is of rubble. The wooden mantle rests on two strong corbels of stone without jambs.

We give (5) the plan of that fireplace and its perspective. (6). Internally the hood is oval and ascends to a circular f flue. Frequently iron handles are fixed under the mantle to allow persons standing to warm their feet alternately without fatigue. Also benches are sometimes placed on the hearth beside the jambs, so that one can warm himself while remaining under the mantle, when the fire is reduced to a few brands. Into these great fireplaces were cast trunks of trees 7 to 10 ft. long, thus obtaining centres of heat of such intensity, that it permitted warming vast halls. Although our fathers were less chilly than we are, being accustomed to live in the open air at all seasons, yet the gathering of the family at the hearth of the hall was evidently for them one of the most vivid pleasures of the long evenings of winter. The lord of the castle being obliged to shut himself up within his manor as soon as the sun set, collected around his hearth not only the members of his family, but his servants, his men who retturned from the fields, travelers to whom was given hispitality; it was before the clear flame sparkling on the hearth, t that each one gave account of the use of his time during the day, when the supper was served and divided among all, that were related those interminable legends now collected with so much care, and whose diffuse tales scarcely accord with our modern impatience. A long candle of tallow, resin or wax, set on the tablet adjoining the mantle of the chimney or stuck on an iron point, and the brilliant flame of the hearth lighted the persons thus gathered, permitting the women to spin or to execute some needlework. When the curfew sounded, everyone sought his bed, and the live coals heaped up by a servant by means of long iron shovels, retained the heat in the hall during a part of the night, for the master, his wife and his children had their curtained beds in the hall; frequenlty strangers and some followers also slept in this hall on benches covered by cushions, on bedsteads or litters.

Dating from the 13 th century, the kitchens are no longer isolated halls, vast workshops in which were cooked at the

pieces, like that of the fireplace of Puy. Yet we already see at the end of the 12 th century the arch adopted for the mantle. There exists in the castle of Vauce near Ebreuil a beautiful fireplace so constructed on a rectangular plan; (3);[1] Its mantle consists of two blocks fixed in the wall and resting on the jambs, and a keystone; it is only 8 ins. thick. The b back of the fireplace is laid in tiles, to better resist the effect of the fire. Later a plate of cast iron placed vertically before the back further protected the masonry from the heat of the fire, and brick squares lovered the hearth.

Note 1.p.195. We owe the drawing of this fireplace to the courtesy of M. Millet, architect.

Note 1.p.196. Contrecoeur is the name given to the back of the fireplace.

Rarely in the 12 th century were fireplaces placed against division walls; by preference they were placed on the front wall between two windows. If the wall of the house was not v very thick, the back formed a corbelled projection on the exterior, as may be seen in some examples in the houses of the city of Cluny, or it rested on the projection formed by the entrance doorway of the ground story. This last arrangement still exists in a Norman house of the 12 th century in the city of Lincoln in England, called the Jew's house. It presents too much interest to be omitted here (4). The fireplace warms the principal hall in the second story, and the back A, as well as the flue above it,rests entirely on an arch set on two corbels forming a hood over the doorway B on the street. While warming one's self, he desired to see what was passing in the street, and not content with placing the fireplaces b between the windows of the facades of houses, the citizens so sometimes pierced a small window in even the back of the fireplace at one side, so as to remain under the mantle while having a view of the outside. When the mantles of fireplaces a are wider, they are frequently of wood in private houses, for it was difficult to procure lintels sufficiently long and resistant to form mantles of a single piece, and their jointing presented difficulties. There exists in a house of the city of Cluny, No. 13 Rue d'Avril, a great fireplace attached to the front wall, with corbelled back, whose mantle consists of a curved piece of carpentry. At each side of the fireplace o

CHEMINEE. Fireplace. Mantle. Hood.

Fireplace arranged in a room with flue for conducting the smoke. It does not appear that there were fireplaces in the interiors of palaces or houses of the Romanesque epoch. During the first centuries of the middle ages interiors of apartments were warmed by means of braziers filled with burning coals, t that were rolled from one room into another, as still practised in Italy and Spain, or by hypocausts, i.e., by furnaces underneath, which supplied heat by ducts under the pavement of rooms and in the thickness of walls, just like our modern hot air furnaces. In the primitive abbeys, this mode of heating was usual, as shown by the plan of the abbey of S. Gall, which dates from about 820.(Art. Architecture monastique,p.243.). The primitive kitchens of abbeys and castles had no fireplaces, properly speaking, but were themselves only an immense fireplace furnished with one or several flues for the escape of the smoke. We scarcely see fireplaces or hearths appear in interiors, only in the 12 th century, and from that epoch examples abound. The primitive fireplace consists of a recess made in the thickness of the wall, enclosed at each side by jambs and surmounted by a mantle and hood, under which the smoke passes. The oldest fireplaces are frequently traced on a circular plan, the hearth forming a segment of a circle and the mantle the other segment. Such is the beautiful fireplace to be seen today in the building of the precentor dependant on the cathedral of Puy-en-Velay, and which dates from the 12 th century. We give its plan (1) and perspective.(2). The hood of this fireplace takes the conical form and ends in a cylindrical flue, half whose diameter projects from the face of the internal wall. This flue is much higher than the gable of the building; but we shall soon come to that essential part of the chimney. One may yet see in the kitchen of the lod college of Vezelay a beautiful sculptured fireplace, but on a r rectangular plan, also dating from the 12 th century.[1]

Note 1.p.194. This fireplace is engraved in the 7 th pamphlet of the Bulletin du Comite de l'hist. et des arts en France, after a drawing by M. E. Ame.

The fireplaces of the 12 th century do not assume dimensions as wide as those built a century later. Thus the mantle in t that epoch is formed of a lintel of a single piece or of two

castle, is that the first is a structure solely intended for the defense or the guard of a port, ravine, bridge, or even a city, not like the castle possessing buildings for habitation or pleasure; the chatelet is not a feudal residence, but a fort occupied by a captain and men at arms. This is then its secondary purpose, and not its importance in extent and strength, that makes of it a deminutive of the castle.

Sometimes the chatelet was only a single great square tower placed across a passage, or even a palisade work with some fl-flankings. (Arts. Bastile, Porte).

CHEMIN DE RONDE. Covered Way. Gallery on the Walls.

This was the projection of the rampart behind the parapet required for defense and passage. The parapet being set flush with the external surface of the walls, and having a thickness varying from 15 to 23 ins., there remained within the rampart a crown of masonry covered by stone slabs, forming the gallery of the walls. Naturally the galleries were more or less wide by reason of the thickness of the rampart. When the wall had only a small thickness, the slabs of the gallery projected i inside to supplement the masonry and to allow at least two men to pass in front.

During the Carlovingian period, the galleries of the ramparts were placed in direct communication with the internal terrace by means of stairs not far apart. later, after the 12 th century, one could generally pass around in the galleries only by passing through towers and the stairs serving their stories. The inhabitants of a city thus did not have the free e enjoyment of them, and they were particularly reserved for t the garrison. From a very ancient epoch, in time of war the g galleries were enlarged by means of covered galleries of wood, corbelled out before the parapets, designated by the name of "hourd" in the North, of "corseras" in Languedoc. In the 14 th century, the galleries had machicolations of stone, covered or uncovered. Later still, after the use of artillery in the defense of places, wooden galleries were sometimes placed above the parapets pierced by embrasures destined to receive the cannon. (Arts. Architecture militaire, Chateau, Courtine, Embrasure, Enceinte, Hourd, Machicoulis.

earth, that besiegers erected at distances between the enclosing lines to strengthen the posts designed to guard these lines.

From the 9 th century the city of Paris was surrounded by w walls flanked by irregular towers, all of wood. Two bridges gave access into the city, one on the north at the place now termed Pont-au-Change, the other at the south at the place called Petit-Pont. The heads of these two bridges were probably already defended by forts before that epoch. One, that on the north, was termed the Great Chatelet, the other at the s south being the Little Chatelet. The great chatelet formed a fortress nearly square with a court in the middle and indirect gates. Two towers flanked the two angles toward the suburb. The little chatelet was in reality but a gate with barrack a above and two flanking towers. These works were destroyed on several occations in the Norman invasions, but were rebuilt under Philip August, then under S. Louis, and were repained under Charles V. They were both demolished after the revolution.

The chatelets sometimes assumed the importance of an actual castle with its external lists, barracks, flanked enclosures and its keep. Such was the one that formed the bridgehead at Pont de l'Arche on the Seine, and of which we here give a sketch (1) from an engraving of Merian. But what distinguishes the chatelet from the castle is less its extent than its function. The chatelet defends a passage. William of Nangis states that in 1179 the Templars built at the ford of Jacob a chatelet, that the Turks took and destroyed.[1]

Note 1.p.192. See Latin note.

The name of chatelet is not at all arbitrary; thus marshal Boucicault caused to be erected several forts in the city of Genoa at the beginning of the 15 th century; one, that of the port was called the Darse; the other castle was built in the strongest place in the city and was called Chatelet, so strong that little defense was kept against everyone. It was so constructed that those in the said castle could go and come in spite of all their enemies, to the other castle at the port called the Darse."[1]

Note 1.p.193. Livre des faicts du mareschal de Boucicaut. Chap. 9. Coll. des mon. pour serv. a l'hist. de France.

What appears to specially distinguish the chatelet from the

Our old churches of the middle ages, all despoiled as they are, are still living; Catholic worship is not modified; aud if it has suffered since the 13 th century some changes in liturgy, these changes have not sufficient importance to have removed from us the sacred edifices. But feudal castles belonged to times so different from ours, tha to comprehend them it is necessary to carry ourselves in thought back to that h heroic epoch of our history. If their study has for us today no practical purpose, it leaves in the mind a deeply grooved trace. That study is not without fruit; seriously made, it e effaces from the memory the errors disseminated concerning feudalism; it bares customs impressed by savage energy, absolute independence, to which it is sometimes well to return, were it only to know the origins of the forces of our country, still fortunately alive. Feudalism was a rude cradle; but the nation that passed its infancy therein, and could resist that stern apprenticeship to political life without perishing, must acquire a vigor, that has allowed it to pass from great perils without exhaustion. Respect those ruins, so long accursed, n now that they are silent, injured by time and revolutions; e examine them, not as remains of oppression and barbarism, but indeed as we regard the empty house, where we learned under a stern and strange master, to know life and to become men. Feudalism is dead of age and detested, let us forget its faults, to remember only the services it has rendered to the entire nation by accustoming it to arms, placing it in the alternative either to perish miserably or to establish itself, to unite around the royal power; retaining in its midst and perpetuating certain laws of chivalrous honor, that we are happy to possess today, and to find them again in difficult times. Never permit avaricious hands to destroy furiously the last vestige of these habitations, now that they have ceased to be formidable, for it is not proper for a nation to scorn its past, still less to curse it.

CHATELET. Little Castle. Fort.

This name was given during the middle ages to little castles established at the head of a bridge, the passage of a ford, across a road outside a city, or at the entrance of a ravine. Also by the word chatelet were designated works of timber or

Agrippa d'Aubigne appears to us as the last scion of that powerful race; he was a hero of the 12 th century, who arose at once at a time already far removed in customs from that grand epoch. At the last perhaps he dared to shut himself within the fortresses of Maillezay and of Dognon, to hold them against t the armies of the king, to which he never surrendered them; on leaving France he sold them to M. de Rohan. With that man of remarkable character, a singular combination of fidelity and indeoendence, more partisan than French, we extenguished the spirit of resistance of the nobility. When by consent or by force, under the hand of Richelieu and the absolute rule of Louis XIV, feudalism henceforth yielded the contest with the royal power, its residences took a new form, which retaimed nothing of the feudal fortress of the middle ages.

Yet the Frence chateau until the 18 th century furnished vevery remarkable examples, superior to everything of that kind found in England, Italy and Germany. The chateaus of Tanlay, Ancy-le-Franc, Verneuil, Vaux, Maisons, the old chateau of V Versailles, the destroyed chateaus of Meudon, Rueil, Richelieu, Beves in Nivernais, Pont en Champagne, Blerancourt in Picardy, Coulommiers in Brie, present vast subjects of study for the architect. One finds there the grandeur of the beginning of the 17 th century, a solid grandeur without false ornaments; broad and well understood arrangements, a real richness. In these residences is no trace of towers, battlements, of c crooked passages; these are vast open palaces, surrounded by magnificent gardens and easy of access. The sovereign alone can occupy such residences today, as far from our daily habitations and our fortunes of the newly rich, as are the fortified castles of the middle ages.

The revolution of 1792 destroyed forever the chateau, and what men build today in that sort in France, presents only pale copies of a lost art, because it is no longer in relations with our customs. A country, that has suppressed aristocracy and all the privileges appertaining thereto, cannot seriously build chateaus. For what is a chateau in case of a d division of the estate, if not the caprice of a day? A costly dwelling that perishes with its owner, leaving no remembrance, is destined to serve as a quarry for some peasant's houses or a factory.

make these towers habitable, it was necessary to light them by wide windows. To make holes in each story and construct t the projecting bays would have been a difficult work, expensive and lengthy. It was found simpler in this case for towers with wooden floors (and this was the greatest number), to cut from top to bottom a broad vertical opening, and to place in that sort of embrasure as many windows as there were stories, placing again there only jambs, lintels and sills. An illustration is necessary to make this opinion understood. Let (39) be a closed tower; a vertical opening is made as indicated at A, while retaining the internal floors. Then (39 bis) the new windows are built as shown in that Fig. To conceal the rebuilding and avoid the difficulty of bonding the new masonry of the jambs with the old external surfaces of the towers, which were often very rough, at each side of the opening were placed pilasters of small projection, superposed at each story. This construction in patching, the result of necessity, became a decorative motive in the new towers erected at the beginning of the 16 th century, as we see in views of the chateaus of Bury and Chambord. The machicolations also became the occasion of an architectural decoration, when no longer built for defense; at Chambord the towers and walls of buildings are crowned by a cornice, that recalls that ancient defense; it is composed of shells placed on corbels, thus forming a corbelling with outilne representing machicolations. Nothing Italian in these traditions, which at Chambord are the principal ornamentation of all the exteriors.

In the 16 th century French soil was covered by a multitude of chateaus admired by foreigners. For beside the old feudal residences, preserved for their importance or their strength, in the place of nearly all castles of the second order, the nobles had erected elegant residencer, in the construction of which they sought to retain the ancient picturesque appearance of the fortified dwellings. The wars of religion, Richelieu and the Fronde destroyed a great number of them. Then the nobility perceived a little too late, that in razing its fortresses to replace them by open residences, it had given new force to the invasions of royalty. Particularly during the struggles at the end of the 16 th century and the beginning of the 17 th, the supreme efforts of the feudal nobility made themselves felt.

and that show what was then the fashion of wits in France, to find nothing good that came from Italy.(See Old French poem).

Some French master of works, some Claude or Blaise of Tours or of Blois, built Chambord; and if Primaticcio did something there, little appears there. But to have at court a foreign artist, to make him a sort of superintendent of buildings, to load him with pensions, that had a better appearance than to employ Claude or Blaise, a native of Tours or of Blois, an old fellow who was on his workyard while the Italian painter and architect explained the plans of the old man to the marvelling lords of the court. Our readers will kindly pardon us that digression concerning Primaticcio; but we see in that man only a mediocre artist, who was unable to carry on his profession in Italy, where were then found a hundred architects and painters superior to him, and he came to France to borrow a glory belonging to modest men, good architects, whose sole offense was to be born in our country, and not to call themselves John or Peter.

Chambord is to the feudal castle of the 13 th aod 14 th centuries what the abbey of Theleme is to the abbeys of the 12 th century, a parody. Richer than Rabelais, Francis I realized his dream; but both attained the same result; the parody written by Rabelais undermined the aged monastic institutions, as the parody in stone of Francis I gave the last blow to the c closed castles of the great vassals. We repeat, there is nothing Italian in all that, neither in thought nor in form.

On the exterior, what is the appearance of tha splendid h habitation? There is a multitude of conical roofs terminated by lanterns rising from the towers, turrets, immense chimney caps richly carved and incrusted with slates, a forest of points and dormers of stone; finally nothing that resembles the feudal Italian residence, but on the contrary an evident intention to recall the French chateau equipped with its covering by pointed roofs, possessing its keep, its platform, watch tower, winding stairways, secret corridors, cellars and moats.

But Chambord gives us occasion to mention a singular fact. In many castles partly rebuilt at the beginning of the 16 th century, the old towers were retained, as much because of their extreme solidity and the difficulty of demolishing them, as because they were the mark of the feudal residence. Put to m

neither sense nor reason, we shall not discuss its merit here; we shall take the chateau of Chambord for what it is, as an attempt to unite two programmes set by two opposed principles, to weld into a single edifice the fortified castle of the middle ages and the pleasure palace. We grant that the attempt was absurd; but the French Renaissance is full of hesitations at its beginning, in letters, sciences and arts; it only walks forward while sometimes casting backward a look of regret, it wishes to free inself from the past and dares not break with tradition; the Gothic vestment seems to be worn out, and it has no other yet to replace it.

The chateau of Chambord is built in the midst of a country favorable for hunting, surrounded by forests covering a rustic plain; distant from cities, it is evidently a place for pleasure, retored, a perfect choice for enjoying at the same time all the advantages offered by solitude and the habitation of a luxurious palace. To understand Chambord it is necessary to know the court of Francis I. That prince had passed t the first years of his youth near his mother, the duchess of Angouleme, who lived on bad terms with Anne of Brittany, distant from the court, residing sometimes in the chateau of Cognac, sometimes at Blois, and sometimes at her house of Romorantin. Francis had retained a particular affection for the p places in which his infancy had passed in the utmost freedom. Having reached the throne, he desired to make of Chambord a magnificent chateau, which until then was only an old manor built by the counts of Blois, a royal residence. It is pretended that Primaticcio was charged with the construction of Chambord; were Primaticcio there to assure us, we could not believe it, for Chambord has none of the characters of the Italian architecture of the beginning of the 16 th century; in plan, appearance and construction, it is a work not only French, but from the banks of the Loire. If one desires us to grant that Primaticcio built Chambord in seeking to appropriate to himself the French style, well; but then this work was not by him, he only gave it his name, and that matters little to us.[1]

Note 1.p.188. Our old poet, Charles of Saint-Marthe, born in 1-12 and died in 1555, in his Advice to poets while Chambord was under construction, wrote these verses full of sense,

creations, and the cavalier view of the chateau of Bury, that we give (37),[1] emphasizes better than description all the elegance in these habitations of nobles in the Renaissance, that came to replace the gloomy closed castles of the middle ages.

Note 1.p.183. See Du Cerceau and the (little) work of Israel Sylvestre. Also in the Guide hist. du voyage a Blois et aux e environs, by M. de la Saussaye, 1815, an excellent Note on t this beautiful chateau of the Renaissance.

We shall not multiply these examples; they are in the hands of all, and the monuments are there to speak eloquently. Blois, Gaillon, Azay-le-Rideau, Chenonceaux, Amboise, the new chateau of Loches, the chateau of Usse, and so many other residences of nobles from the beginning of the 16 th century offer a charming subject of studies for architects; they are the most brilliant expression of the French Renaissance, and which spoils nothing, are the most natural application of antique art among us. Royalty gave the example, and around it rose the m most beautiful chateaus of the 16 th century. Sovereign in f fact henceforth, it gave an impulse to the arts as to politics. Francis I, that chivalrous king that gave the last stroke to chivalry, destroyed the old royal residences, and his example overthrew more keeps, than all his predecessors and successors together could destroy by force. He tore down the great t tower of the Louvre, on which depended all the fiefs in France. What lord of the court after him could dream of preserving h his feudal nest? That prince began and completed the transition from the residence of the mediaeval noble to the modern chateau, that of Louis XIII and Louis XIV. He built Chambord and Madrid. The first of these two palaces still retains the impress of the feudal castle; the second is only a pleasure residence in which one no longer finds a trace of the old traditions. Although we are not a passionate admirer of the chateau of Chambord, not by much, still we cannot pass it in s silence; it should naturally close this Article. We give its plan here.(38).[1]

Note 1.p.185. At the scale of 1 : 200.

No person in France has not seen that singular residence. Praised by some as the most complete expression of the art of architecture at the moment of the Renaissance, disparaged by others as an eccentric fancy, a colossal caprice, a work with

power, not a defense having any value. But as we said above, the nobles could not abandon these visible marks of their ancient independence; as for them, they had no chateau without towers and battlements, moad and drawbridge.

Such was also the beautiful chateau of Bury, situated 5 miles from Blois and near the Loire. The buildings were erected by lord Florimond de Robertet, secretary of State under kings Ch Charles VIII, Louis XII and Francis I. They comprised all that composed the residence of a mediaeval lord. One entered the principal court of the chateau by a drawbridge A flanked by two little towers.(36). That court F was bordered on three s sides by perfectly regular buildings, although they were intended to contain different services, and were terminated by four towers at the angles. From the main building one descended into a private garden E with a monumental fountain at the centre, terminated by two other isolated towers at the angles, containing lodgings, and a little chapel G. On the left at C was the lower court with its special entrance B, stables, storehouses and dependances; at D in the rear was a second lower court with gardens, trellises, fruit trees, and a great dovecot in the form of a tower at K. The park extended beyond the buildings, and the front of the chateau as well as the l lower court were surrounded by moats filled with water. The buildings for the habitation were at the back of the lord's court, on the left being the offices and kitchens; on the right at H was the gallery, i.e., the gallery of the hall, that we see still retained as the last memorial of feudal customs. A portico erected behind the front curtain connected the two wings on the right and left, and having only a ground story, did not mask the view of the upper stories of the three main buildings. Here, although the towers with machicolations on their upper part retained the cylindrical form, they provided square chambers inside, that arrangement being much more convenient for occupancy than the circular form. Thus the new customs determined the arrangements no longer in harmony with the old traditions, and these towers, that only served for h habitation, still kept on the exterior their form of military defense. The dovecot itself took the air of an isolated keep. Men then only played at the feudal castles. However this may be from the point of view of art, these buildings are charming

arbhitectural luxury. Later still in the 17 th century, the o offices were modified.

One will note that all the main buildings of the chateaus in this epoch are still single in depth, i.e., they have only the width of one room arranged in sequence; they command each other, and the upper corridors, like the cellars, offer at l least a circulation independent of the halls and chambers at two different heights.[2] It was rarely before the 17 th century that in the chateaus, men commenced to erect main buildings of double depth.

Note 2.p.180. see in Les plus excellents bastiments, by Du Cerceau, the views and details of Chantilly.

Yet is is unnecessary to believe that, at the beginning of the 16 th century, the irregularity of plans was a sort of necessity, the result of a preconceived idea; on the contrary at that epoch, men sought symmetry in the residences of nobles; they sacrificed to it already even the internal arrangement, with the intention of presenting on the exterior regular facades, an entirety of buildings with a monumental appearance. In this respect, Italy exercised an influence on French constructors; but with the borrowing of some architectural details, this was all that the architects took from Italian palaces; for otherwise the lord's chateau retained its French character, both in the entirety of the general arrengement, in the internal distribution, its small flanking towers, and by the mode of covering the buildings.

The beautiful chateau of Verger in Anjou, residence of the princes of Rohan-Guemene, thus joined the old traditions of the feudal castle to the monumental arrangements in vogue at the beginning of the 16 th century. It was composed (35) of a lower court into which one entered by a gate flanked by little round towers, with great towers at the angles, service buildings symmetrically placed in a wing; then the lord's residence, separated from the lower court by a moat, likewise f flanked by four great round towers connected by the nearly s symmetrical great building. An external moat surrounded the entire chateau. One sees in this view that the front curtain and its two towers are still pierced at their base by embrasures for cannon, and that they are furnished with machicolations and battlements. This was no longer more than a mark of

garden. On one side of this garden is the lower court I, in which are several buildings intended for stables. Besides the grand garden and near it is another, not of such size. These gardens are surrounded by places, some of which are woods, meadows, copses, cherry trees, large trees and other conveniences. Some of these places are enclosed by courts, the others not so; in these places is the heronry. The park is very large, its entrance being at one side of the chateau, where is water that gives good pleasure. This place is enclosed on the side next Paris by the forest of Senlis, in which there is a vaulted passage for going to the gread road to Paris. F Finally this place is held to be one of the most beautiful p places in France."

Note 1.p.179. Les plus excellents bastiments de France. B Book 2.

In this residence, which from the point of view of construction has really nothing of a fortress, we see again retained all the arrangements of the feudal castles. Isolation by means of ponds and moats full of water, narrow bridges not easy of access, small flanking towers at the angles, forecourt with the offices, lower court with the dependances, enclosed gardens with promenade, irregular buildings arranged according to the dimensions of the rooms contained, crooked passages, immense cellars permitting storage of considerable provisions, and finally a long vaulted passage for communicating with the great road without being seen. Yet the chateau of Chantilly, no more than that of Creuil, could oppose a serious defense to the attack of an armed force.[1] The curtains and small towers of the chateau are opende by wide windows, the roofs furnished with beautiful dormers; but the upper gallery with the traditional machicolations is still retained. If these upper galleries could no longer protect the chateau agains the effects of artillery, they were still kept for the needs of the service; for they afford long corridors allowing the service of all rooms of the higher stories, and facilitate the oversight.

Note 1.p.180. All the structures do not date from the same epoch; the oldest date from the end of the 15 th century. But during the 16 th century the buildings, and particularly the interiors, in great part were decorated with great architectu-

destroyed after the revolution.

On these principles the chateau of Chantilly was erected a little later, though in grander proportions. Chantilly is situated about 2.5 miles from Senlis, and is one of the most charming places in that part of France; beautiful water, extensive meadows, magnificent forests caused the choice of the site of the chateau, that was even less intended for defense than Creuil. We give (34) the plan of the admirable general arrangement of this residence, which was the asylum of so many illustrious personages and fine minds. Here is what Du Cerceau says of it.

"The building consists of two parts; the first as a court E in which are some buildings arranged for the offices; the second is another triangular court raised higher than the first by some 9 or 10 ft., it being necessary to ascend from the f first to reach the second." Indeed beside the bridge is seen the little stairway that makes up the difference of level between the two courts." Around the said (triangular) court on all sides is the building of the lord, constructed well and in a good manner. This building and court are founded on a rock, in which are cellars in two stories, being in arrangement rather a labyrinth than a cellar, there are so many aisles in both and all are vaulted. As for the appearance of the arrangement of the lord's building, it adheres entirely neither to antique nor to modern art, but the two are mixed together. T The facades are beautiful and rich. In the first court is the entrance to the building"by the great hall D." The facades of the buildings being there both on the court and exterior well arranged and finished in the antique style. These two courts with their buildings are enclosed by a large area of water l like . pond, while between them is a separation like a moat, through which the said water flows. Over it is a bridge for passing from one court to the other. Joining the great building is a terrace A, placed at one end of the park, to which one goes from the court of the lord's residence by means of a bridge P, across the water, that separates the lord's building and the terrace, and by which one passes over an arch, on which is arranged a covered passage. This place is accompanied by a grand garden B, one of its sides being a gallery on arches (portico), raised a little higher than the rest of the

the new chateaus, although the real utility of so many architectural subterfuges required for defense no longer actually existed. A noble in the middle ages, lodged in one of the chateaus of the 17 th century in which the arrangement is broad and symmetrical, the rooms in sequence, are nearly all of the same dimensions and comprised great parallelograms, the service is direct and easy, the stairways are verw large and allow one to penetrate at once into the heart of the edifice, w would have found himself as uncomfortable, as if he and his f family had been penned in a great room divided by some partitions. He desired secret exits, little rooms separated from great halls by winding ways known to him, side views of the facades, chambers closed and retired for the night, large and lighted areas for assemblages; he desired that his private l life should not be mixed with his public life, and the sojourn in the keep still left a trace in his habits. One hall must o open to the south, the other to the north. He wished to see his forests and his gardens from certain points of view, or indeed the village church beneath which reposed his ancestors, or a certain road or river. Eyes have their habits like the mind, and one may cause a man to die from weariness, who sees what he has seen daily, unless his life is filled by very vigorous occupations. The lives of the nobles, when war did not cause them to leave their castles, was very tedious, and they must pass a good part of their time in looking on the water in their moats, travelers passing along the road, peasants h harvesting on the plain, the storm beating on the forest, the men playing in the lower court. The owner of the castle thus unconsciously contracted habits of meditation, that made him prefer a certain place, window or retreat. One should not be astonished, if in the castles rebuilt in the 16 th century were retained certain irregular arrangements, that were evidently dictated by the private habits of the noble and of members of his family; certainly Italy was not concerned in this, but indeed the architects to whom the nobles entrusted their wishes, the results of a long stay in the same place. There still exist in France quite a large number of chateaus serving as a transition from the fortified castle of the nobles of t the middle ages to the country palace of the end of the 16 th century. Their plans are frequently irregular like those of t

the castles of the 12 th to the 14 th centuries, either because rebuilt in using the old foundations, or because desiring to enjoy certain points of view, retaining arrangements consecrated by habit, or to profit by the most favorable orientation of each of the services.

Such, for example, was the chateau of Creil, built on an i island in the Oise, commenced under Charles V and entirely rebuilt at the end of the 15 th and the beginning of the 16 th centuries. We give its plan.(32).[1] At A was the bridge joining the island to both banks of the Oise, protected by a little fort; at B, the entrance to the lower court. The habitation of the lord was entered by a second bridge C placed over a wide moat filled with water; at D is the court, surrounded by buildings for habitation. According to a very frequent custom, a little church built in the lower court served as chapel, of the castle and parish for the inhabitants of t the city. At E was a garden reserved for the occupants of the chateau. This plan emphasizes what we have just said concerning the taste retained by the nobility for the complex arrangements of the feudal castles. That of Cheuil, although naturally protected by its location in the middle of a river, was not built to sustain a siege; and yet we find there, if not the formidable towers of mediaeval castles, a number of flanking round towers, the projecting pavilions arranged for enjoying the external view, and offering in the interior those closets and retreats so much loved by the owner. The view (33) that we give, taken from the little fort A,[1] will dispense w with longer descriptions; it indicates very clearly, that all these small towers and projecting pavilions were not erected for the needs of defense, but for the pleasure of the occupants, and to imitate in some sort the great feudal fortress. T The watch towers and the sharp roofs were multiplied, as if to recall at a small scale the external appearance of the old c castles bristling with defenses; but this was no longer more that a play, a caprice of a rich noble, not pretending to be at war with his neighbors, but who still desired his residence to have the appearance of a fortified mansion.

Note 1.p.175. At the scale of 7 : 1000.

Note 1.p.176. This view and the plan are taken from the work of Du Cerceau on Batiments de France, the chateau having been

ornamented internally as well as externally, but in which one finds however far more traces of French arts than of the arts imported from Italy. The French architects knew how to derive a marvellous result from that mixture of ancient traditions with new customs, and the chateaus that they erected in that epoch are chiefly masterpieces of taste, very superior to what the Italian Renaissance could do in that kind. Always faithful to their ancient principles, they never sacrificed reason and good sense to the passion for symmetry and novel forms, and were only wrong in allowing it to be said and believed, t that Italy was the source of their inspirations.

But before presenting to our readers some examples of these chateaus of the first time of the Renaissance, and to cause to be understood how they satisfied the customs of their occupants, it is necessary to know the inclinations of the nobles at that epoch. The feudal castle has been seen to sacrifice everything to defense, even in the time when the aristocracy had already adopted habits of luxury and of very advanced comfort. The means of defense of these residences chiefly consisted of unexpected and singular arrangements, so as to perplex an assailant; for if all strong castles had been built on nearly the same model, the same means that had succeeded in obtaining possession of one, would have been employed to take all. It was then important for each noble, that constructed a place of safety, to unceasingly modify the details of the defense, to surprise the assailant by arrangementr that he could not foresee. Hence an extreme variety in these residences, a refinement of precautions in the internal arrangement, a s systematic irregularity; for each one strove to do better or differently from his neighbor. Habits of this kind were contracted by successive generations during several centuries, and could not be abandoned from one day to the morrow; the p possessor of a castle when rebuilding his castle at the beginning of the 16 th century, would have been very badly lodged in his opinion, if he had not recognized at each step in his new dwelling those turns, interrupted stairs, galleries without exits, secret cabinets, those turrets flanking the castle of his father or grandfather. The daily habits of life were so arranged for several centuries for these internally complex residences, and once adopted must influence the programme of

recognized in the monuments as undeniable witnesses, is that the desires of France nobles were interpreted by French artists, that knew how to satisfy these new programmes in an entirely original manner, which belonged to them and borrowed v very little from Italy. It is unnecessary to be very expert in architecture to see, that there is no relation between the c country villas of the Italians at the end of the 15 th century and our French chateaus of the Renaissance. No analogy in the plans, the arrangement, in the mode of opening windows a and of covering the edifices; no resemblance in the internal and external decorations. The city and country palaces in Italy always present a certain rectilinear mass, symmetrical a arrangements, that we find in no French chateau of the Renaissance and even to Louis XIV. If the architecture consisted o only in some mouldings, pilasters and friezes decorated by a arabesques, we would freely grant that the French Renaissance becam Italian; but this art is happily above those possibilities; the principles by which it must direct and express itself are derived from much more serious considerations. Proportion, satisfaction of needs,and harmony that must exist between the customs of the occupants and the habitation, judicious use of materials, respect for traditions and customs of the country, these must primarily direct the architect and d directed the French architects of the Renaissance in the construction of the residences of the nobles; they erected chateaus still impressed by old feudal memories, but clothed in a new exterior in harmony with that elegant, learned, polished, ed and chivalrous society, a little pedantic and affected, that the 16 th century saw appear, and which showed such vivid splendor during the course of the following century. Whether by instinct or by reason, the territorial aristocracy comprehended that material force was no longer the sole predominant power in France, that its fortresses became almost ridiculous in comparison with the royal predominance; its formidable keeps and old rusty arms could no longer inspire respect and f fear in the midst of people daily richer, more united, and b beginning to feel their strength, to discuss, to be alive in the political life. Like men of taste, most nobles frankly y yielded, and razed their battlemented walls and closed towers, to erect in their places stately residences, open, richly or-

the abuse of the principle of the subdivision of property accepted by the revolution op the last (17 th) century. In the face of this persistent demand from the agricultural class, feudal nobles needing money to rebuild theireresidences and to maintain an always increasing staff of servants at wages, abandoned the greater part of their lands, gave up their privileges, rights of hunting, fishing, over the roads, bridges and streams of water. Some were absorbed by royalty, others by the country people. While the nobles thought of opening t their castles, no longer counting upon defending them, rebuilt them at great expense, their love of luxury and comfort increased, they drained the source of the revenues to procure r ready money. Once in that path, their final ruin could be foreseen. However extensive their concessions, however weakened was their power, the memory of the feudal oppression of the middle ages always remained as vivid in the country; and on the day when loaded by debts, their castles open, most of their rights only existing in their archives, the lords were surprised by the attacks of the common people, the peasants threw themselves on their habitations to tear them down to the last stones.

The new form taken by the feudal residence at the beginning of the 16 th century merits our entire attention; for at that epoch, if religious architecture decreased rapidly to never rise again, and presents only pale reflections of a dying art, that knew not whither it goes, what it desies or not, it is not the same with the architecture of the dwellings of the n nobles. In losing their character of fortresses, they take a new one full of charm, and whose study is one of the most interesting and most instructive, that can be made. It has been repeated everywhere and in all forms, that the architecture of the Renaissance in France sought its types in Italy; this has even gone so far as to say, that its most graceful conceptions were due to Itailian artists. It cannot be denied, that the r revolution produced in the art of architecture at the end of the 1. th century coincides with our conquests in Italy; that the French nobility, leaving its gloomy keeps, was charmed by the smiling Italian villas, and that returning home, its first care was to transform its dark castles into sumptous habitations, gleaming with marbles and sculptures. But what must be

The fortress became henceforth the citadel of the State intended for the defense of the territory, and was separated from the chateau, which was no longer anything but a country palace, comprising all that contribute to the comfort and pleasure of the occupants. The taste for luxurious residences that the nobles contracted in Italy during the campaigns of Charles VIII, Louis XII and Francis I, dealt the last blow to the feudal castle. Many nobles having visited the villas anf palaces beyond the mountains, on their return found their old h hereditary fortresses dark and gloomy. Retaining the keep and the principal towers as a mark of their ancient power, they overthrew the closed curtains connecting them and replaced thes by buildings widely opened, accompanied by loggias and porticos decorated with luxury. The baileys or lower courts, surrounded by defenses and towers, were replaced by outer courts containing outbuildings intended for lodging the servants, so-splendid stables, gardens furnished with flowers, fountains, handball courts, promenades, etc. The nobles then no longer thought of causing themselves to be served by levied men, as had occurred two centuries earlier; they had servants at wages, who must be lodged and fed in the chateau and its dependances. Gradually the servants of all ranks were freed from levies and from all faudal rights that led to servitude, either by means of perpetual rents, or by sums paid once.

From the beginning of the 16 th century, many peasants were owners, and after the various rents were paid, had nothing to do with their lord. After the 13 th century the people in the country had not abandoned for a single day the hope of first becoming free, then becoming owners of the soil they cultivated. It would be curious (if the matter were possible) to compute the enormous sums successively sacrificed to that passion for land. They gradually purchased the feudal rights over persons, of mortmain, marriage, forced labor, rents in kind, then the rights over the land; finally pursuing their aims till our days, they agreed to liens under the form of rents, allowing no opportunity to escape, not only to remain on the soil, but to acquire it. Today the peasant purchases the ground at enormous prices, much more for the love of property than for interest, since his capital frequently returns him only one half of one per cent. Thus he seems by instinct destined to oppose

shall have occasion to return to this beautiful structure in Art. Salle.

Although the castle of Hochkönigsburg presents a singular mixture of old and new defensive arrangements, we already find there a very marked intention to employ cannon and to oppose their effects; in this respect and because of the precise date of its construction, this place merits being studied. The structures appear to have been built in haste and partly with more ancient ruins; but we find in their entirety a grandeur and a boldness producing much effect. The part reserved for the habitation especially seems to belong to heroic times. The great hall M in two stories was vaulted in its upper part, probably to place cannon on the terrace roof. Placed across the ridge of the rock, the barbette batteries located on this very elevated platform command on one side the great work E a and the rear of G. The keep L is entirely without openings e except the doorway, which is narrow and low. Probably in this tower was stored the powder. In its upper part, that can be reached only by a little external stairway, it served as a l lookout, for it dominates the entire defenses, both by its s site on a peak of the rock, as well as by its height.

In 1663 the castle of Hochkönigsburg,maintained and garrisoned until then, was besieged by the Swedes. They took the outer fort, and mounted a battery of mortars there, and bombarded the place, which was not built to resist those terrible guns. It was partly destroyed, burned, and the garrison was obliged to surrender.

But at the end of the 15 th century cannon began the great leveling of French society. Artillery required the use of powerful and expensive means of defense. The nobles were no longer rich enough to build fortresses able to seriously resist this new agent of destruction, to equip them efficiently, nor independent enough to be able to erect purely military castles in opposition to the royal authority, under the eyes of a people decided to support no longer the abuses of the feudal power. Already at that epoch the lords appeared to accept their new condition; if they built castles, these were no longer f fortresses, but pleasure houses in which was still found a last reflection of the feudal residences of the middle ages. The king himself gave the example; he abandoned walled castles.

the counts of Thierstein, and for other just motives, he has granted to them as a fief the ruined castle of HochkÖnigsburg with its dependances, and that he permits them to rebuild it. Consequently by virtue of the imperial power, he prays the m magistrates of Strasburg and orders them to aid the counts of Thierstein, to lend them help and assistance against all who oppose them in taking possession, the rebuilding and enjoyment of the said castle, to not allow them to be disturbed, and to furnish them with faithful assistance, in the name of the Holy Empire, against all who dare to attack their rights."

We give (30) the plan of the entire place. To explain the eccentric form of this plan, it is necessary to know that HochkÖnigsburg is located on the summit of a mountain forming a series of steep rocks dominating the rich valley of Schlettstadt and commanding two ravines. The structures are at very different levels by reason of the nature of the ground, are sunk in a point of rock at the side A, rise at a peak B, following the slope of the mountain as far as the point C. The residence buildings are erected at D, probably on the site of the old castle, portions of which are found standing and imbedded in the structures of 1479. The brothers Oswald and William caused a part of the plateau to be cut off to establish the great works opposing approach at E. By that side alone is the castle accessible. About 656 ft. from that point on the extended ridge of the mountain rose a fort now destroyed, but whose site was important to the safety of the place. The work E, terraced in F, opposes an enormous thickness of masonry on the only side where the besieger could establish siege batteries. At the top of the crest at G is a higher work equipped with flanking towers for cannon, and at H is a lower enclosure ending in a star and pierced with slots for musketeers a and guns of small calibre. Besides these major defenses, an enclosure I flanked by turrets sweeps the precipice and deprives assailants of all hope of taking the castle by scaling. The entrance is at K, and after having passed around the great work G, one reaches the upper parts occupied by the residence buildings, whose plan we give (31). The square tower L is the keep that dominates the entire defenses, and appears to belong to the old castles, at M is the great hall, one of the most imposing conceptions of the middle ages, that one can see. We

sought at about the middle of the 15 th century to equip a f feudal habitation with artillery by certain arrangements in detail, that actually changed nothing in the general arrangements preceding that epoch. It was not long thus, and possessors of castles recognized at their expense, that to protect their feudal residences, it was necessary to place defenses before and independent of the residence buildings; that it was essential to extend outside on all prominent and unprotected points, so as to prevent the enemy from placing his siege batteries on some terrace commanding the castle.

This beginning of the transition from the old system of defense and the new is apparent in the castle of Hochkönigsburg, located between S. Marie aux Mines and Schlettstadt on the s summit of one of the highest mountains of Alsace. In the 15 th century, the lords of Hochkönigsburg made themselves formidable to their neighbors by their violence and acts of brigandage.[1] Complaints became so serious, that archduke Sigismond of Austria, landgrave of upper Alsace, allied himself with the bishop of Strasburg, the landgrave of lower Alsace, the lords of Ribeaupierre, the bishop and city of Basle, to bring the lords of Hochkönigsburg to reason. The allies indeed took the castle in 1462 and demolished it. This domain, by one of those transfers so frequent in the history of fiefs, was ceded to the house of Austria.Seventeen years after the destruction of Hochkönigsburg the emperor Frederic IV gave it as a fief to the brothers Oswald and William, counts of Thierstein, his councillors and followers.[1] They hastened to restore Hochkönigsburg from its ruins and to make it a very strong place for that epoch, as much by its natural location, as by its special defenses for placing artillery.

Note 1.p.168. We owe the curious information possessed by us for this castle to the well known courtesy of the learned archivist of Strasburg, M. Scheegans, and to our colleague M. Boeswilwald.

Note 1.p.169. "A very important letter," says M. Scheegans in an unpublished notice of Hochkönigsburg, that the emperor wrote to the magistrates of Strasburg, and preserved in the archives of that city, gives the act of cession. By that letter, dated March 14, 1479, the emperor Frederic informs the magistrates, that recognizing the services rendered to him by

by a sweeping fire from cannon, and to guard against scaling by very high buildings, crowned after the old system for a close defense.[1] The keep was covered by a terrace and strongly vaulted, also built to receive cannon on its top, which was justified by the surroundings, that on one side commanded the castle. (Art. Architecture Militaire).

Note 1.p.1.6. We have restored in this view the roofs, that no longer exist; as for the masonry, it is almost intact.

Under Louis XI, the league of the public good marked the la last effort of the feudal aristocracy to seize its ancient p power, at that epoch many lords equipped their castles with new defenses suitable for artillery; these defenses chiefly consisted of outworks, of great thick towers pierced by embrasures to receive cannon, of platforms or ramparts commanding the outside.

The plan of the castle of Arques, that we have given (Fig. 4), has retained in B a work of the end of the 15 th century, arranged before the old entrance to sweep the plateau opposite the north side, and prevent a besieger from enfilading the court of the castle by means of batteries mounted on that plateau, separated from it only by 656 ft. These defenses played a very important part on the day of Arques, Sept. 21, 1589, by sending some shots from their guns into the midst of Mayenne's cavalry at the moment, when the victory was still uncertain. The advanced work of the castle of Arques is well built, and for that epoch possesses very good flankings. In the position already very strong by the situation of the places, the feudal lords generally took little fare for the artillery, and contented themselves with some forts erected around their habitations to protect the approaches and command the roads; particularly around castles in the plain works were executed at the end of the 15 th century tc present obstacles to artillery, that roofs were removed from a great number of towers to terrace them and place cannon there, that fills were made behind the curtains to be able to place guns in battery on their tops, and that the old barbicans were removed to replace them by platforms or ramparts, square or round. Yet the nobles that built new castles took into consideration the new means of attack.

The castle of Bonaquil has already shown us how they had s

slots opened at right and left. The grand stairway only ascended to the ground story, raised from the internal court; its enclosure was terminated at top by a great square tower in communication with the apartments. It is evident that here, as in the lod feudal castles, all the most minute precautions were taken to mask the entrances and make them difficult of access. Indeed, there was but a single entrance at A and B, the turns that we have described being only used by those familiar with the castle and to make sorties when necessary. But these arrangements, then entirely novel, modified the old defensive system; first the advanced work O with the platform gave considerable projections, that fought the outside at a distance and flanked the castle on the side where accessible on a level; then nearly level with the bank of the ditch, at the level of the crest of the walls of the terraces, embrasures for cannon are pierced in the curtains and the tower stories of the towers; the towers are scarcely engaged, so as to better flank the curtains. If one judges by the openings of the gates giving access into the towers, the pieces thus placed in battery in the ground story could not be of great calibre. As for the tops of the towers, they are furnished with projecting galleries with machicolations and battlements; but the corbels supporting the parapets of the great round tower are no longer simple corbels 160 to 1.3 ft. thick; they are great corbellings, inverted pyramids, that resist balls better than the supports of the first machicolations. (Art. Machicoulis). The vertical parts of the parapets are pierced by slots, that evidently indicate by their arrangement the use of muskets.

Note 1.p.186. This plan is at a scale of 7 : 1000.

Here (29) is a cavalier view of this castle, taken from the entrance side.[1] It is seen in this view, that the embrasures intended for cannon are pierced in the lower stories of the structures,and follow the slope of the ground, so as to sweep the exterior. As for the tops of the towers, the method adopted in the 14 th century is still followed. The transition is then evident here, and the problem that the military architects sought to solve in the construction of strong places about the middle of the 15 th century might be summarized in this formula:-- "To batter the outside afar, to defend the approaches

did not occur, but they had no importance in view of the events agitating the nation. Thus few castles were erected in th that period of terrible struggles. In the castles built about the middle of the 15 th century however, it is evident that cannon commance to engage the attention of the constructors; they did not abandon the old system of curtains flanked by t towers, a system consecrated by too long use to be dropped a abruptly; but they modified it in details; they extended the external defenses, and no longer thought of placing cannon on towers or curtains. Retaining their tops for close defense, they formed embrasures in the lower parts of the towers.

This transition is very interesting to study, and although we possess few castles built at a single time under the reighn of Charles VII, there is one to be given here, because of its state of preservation as well as that its system of defense is arranged with system in all parts; this the castle of Bonaguil. Located at some miles from Villeneuve d'Agen, this castle is built on a promontory commanding a defile; its site is that of all mountain castles; surrounded by precipices, it is only accessible at a single side.

Here is the plan (28);[1] at A is the first entrance, with a drawbridge and opening into an advanced work, a sort of barbican or rampart O. It is evident here that the constructors were forced to flank this first defense. At R were probably t the stables. A wide ditch cut in the rock separates the advanced work from the castle, into which one penetrated by a second drawbridge B with gate and postern C. A keep E of unusual form commands the exterior, the advanced work and the ditches. At P were erected the residence buildings, reached by a beautiful winding stairway J. D is the ramp ascending to the much elevated doorway of the keep E. At S is a work separated from the castle by the keep. As at Pierrefonds, the keep forms a separation between two courts. The drawbridges being raised, one could only enter the castle by passing through the postern F opened in the external wall, following the bottom of the d ditch N, passing a second gate opened in a cross wall, a third doorway N opening on a beautiful platform M, taking the stairs I and passing over a little drawbridge K. There was found a f fine and wide stairs with railing communicating with the internal stairs J only by a narrow and dark corridor, on which

that it was necessary to modify the defenses to preserve them from these new engines of destruction. it was only with great difficulty that they yielded to the evidence, the old towers of their castles inspired them with so much confidence. On the contrary, cannon were adopted with enthusiasm by the national armies, the people and royalty. The people, either by instinct or reason, quickly understood, that they finally had in their hands the means of destroying that feudal power, to which they had vowed mortal hatred since the 14 th century. An army of peasants could not resist those men sheathed in iron, accustomed from infancy to handle arms and possessing that confidence in their strength and courage, that compensated for numbers. Attempts at open revolt had also been cruelly punished during the 14 th century, and in place of the old castles of the 12 th century, the people of the country and market towns during the reign of Charles V and in the beginning of that of Charles VI, had seen their feudal lords erect new fortresses, as imposing in appearance as they were equipped and arranged for defense. The barons were prouder than ever, in spite of the diminution of their political power, and did not have to fear popular revolts behind their walls, regarding a good castle then as a means of adjustment with the parties desolating the country. The royalty, weakened and ruined, without influence over its great vassals, seemed to have returned to the humiliations of the last Carlovingians. Foreign invasion even added to these misfortunes, and the lords, whether the remained faithful to the king of France, or took the part of the B Burgundians and English, preserved their strong places as a means of obtaining concessions from one or the other party to the detriment of the people, who were always oppressed in these intrigues and these agreements, alone bearing the costs and damages of a disastrous war.

Yet the citizens and artisans sought to benefit by the new military power, that the 14 th century had seen produced, and about 1430 by their efforts, the royal armies could already plant batteries of cannon before the castles. (Art. Architecture Militaire).

But then in France the nobility like the people were all o occupied in driving the English from the kingdom, and the great war stopped the quarrels of the nobles, not that these d

Note 2.p.162. The latter part of the castle is now torn down to some yards above the ground of the court.

The cavalier view of this castle (27) taken toward the south-west angle of the keep explains the general arrangement of the buildings and the various dominations. There is but one story defenses at Sully, but the width of the moats filled with water was an obstacle difficult to pass, it was not necessary, as at Pierrefonds, to fortify against the approaches and the work of miners.[3]

Note 3.p.162. Although the castle is now partly inhabited by M. de Sully, the dismantled towers and the keep are nearly a abandoned; but there exists in the castle itself a model in relief of the buildings executed in the last (18 th) century, which is very exact; this model has served us to complete the parts destroyed during the revolution. The great Sully inhabited this castle after the death of Henry IV, and he caused the opening of the windows in all the stories, which did not exist before that epoch, these openings being made next the internal court.

We do not believe it necessary to multiply examples of the castles built from 1390 to 1420, for in relation to defense, these structures have a striking analogy on the entire area of France. If in the 12 th century, one finds notable differences in the mode of fortifying feudal residences, at the beginning of the 15 th century there was perfect unity in the general method of defense of places and in the customs of the possessors. A great revolution was preparing however, one that must forever destroy the political importance of the feudal castles; cannon became a terrible means of attack and defense; first employed in the country against mobile enemies, it was soon recognized, that it could serve for defense of fortresses. Therefore guns were placed in the exteriors of castles, along the lists and on the platforms. Many keeps and towers lost their roofs, which were replaced by terraces for placing artillery. Yet these guns placed on very high points must produce more fright than injury to the assailants, their plunging and very slow fire caused no great damage.(These pieces took very long to load). On the other hand, the assailants also brought guns of very large calibre to batter the walls, and their effect was such, that the possessors of castles soon recognized

middle ages and all siege machines had attained their greatest perfection. It would give us an idea of what were these residences already richly decorated internally, where customs of luxury and even of comfort commenced to take a great place in the lives of the nobles.

If we desire to see a castle of the same epoch, but built in more modest proportions, it is necessary for us to go to Sully-sur-Loire. The plan given here (26) is at the same scale as that of Pierrefonds.[1] The towers of these two fortresses are of the same diameter, and are combined in the same manner with the view of defense from their tops. But Pierrefonds is a castle built on a steep bank, while Sully is a castle in the plain erected on the bank of the Loire, surrounded by broad and deep moats B fed by the river. The principal building F is the keep, that faces the Loire, only separated from it by a moat and a quite narrow embankment. Before the single entrance C is the lower court surrounded by water and protected by enclosing walls, whose bases alone exist today. According to arrangements adopted from the 13 th century, the gate is divided into a carriage gate and a postern, each having a separate drawbridge. When one has entered the court D, he can penetrate into the keep only by passing over a second drawbridge cast over a moat and a gate well protected and flanked by two little towers, one containing the stairway serving the three stories of this building. Besides this principal stairway, each tower has its service stairs. The stories of the towers, as at Pierrefonds, are not vaulted, but are separated by wooden floors. The main building F is divided in two halls, and has a ground story and two very beautiful upper stories,[1] the second being placed in communication with the galleries with machicolations, slots and battlements. As also at Pierrefonds, the towers considerably dominate the main building F, which itself commands the buildings in the wing. The sides G are only defended by covered curtains and a corner tower.[2]

Note 1.p.161. The scale is 1 : 1000.

Note 2.p.162. We have given in Art. Charpente the section of the upper story. Formerly there was only a single hall occupying the entire length of the building F, and the fireplace that warmed it was built in the left gable at the west. (See the cavalier view, Fig. 2?).

Note 2.p.160. There existed in the gallery of Cerfs of Fontainebleau a painted view of Pierrefonds, which thus found itself in the number of the first places of the kingdom.

In 1616, the marquis of Coeuvre, captain of Pierrefonds, having joined the party of the malcontents, cardinal Richelieu decided in the council of the king, that the place should be besieged by the count of Auvergne. That time it was attacked with system, profiting by the arrangement of the surrounding elevations. Batteries were protected by good earthworks, that still exist, and were erected on the crest of the semicircle of hills enclosing the plateau at its south extremity. The two forts having been crushed by the fire were abandoned by the besieged; the count of Auvergne took possession of them at once, placed there guns of great calibre, and without allowing time for the garrison to recover, opened a terrible fire against the great tower of the keep, the south curtain and t the two corner towers, which lasted two days without relaxation. At the end of the second day the great tower of the keep fell, carrying down in its fall a part of the enclosing curtain. Captain Villeneuve, who commanded for the marquis, then hastened to capitulate, and Richelieu caused the place to be dismantled, reducing the north towers and destroying the greater part of the barracks.

Such as it is today with buildings torn down and its towers penetrated by saps, the castle of Pierrefonds is an inexhaustible subject for study. Excavations have already uncovered the works on the south next the moat, and if these works were continued, they would give precious information; for on this side must be the stronger defenses, being most accessible. One still sees in the ruined halls of the keep traces indicating their internal decoration, which chiefly consisted of w wainscot attached to the walls. The recesses intended to receive the grounds of this woodwork exist, as well as the the numerous anchors and a quantity of nails with prongs suitable for suspending tapestries. Although the destruction of this fortress may have been a necessity, one must regret that it had not remained intact till our days, for it certainly presented the most complete specimen of a castle built at one time, at an epoch when artillery was not yet employed as a means for attacking fortresses, and yet when shooting weapons of the m

good masonry with facing of hard cut stone. When the assailants were once within the lists, they found themselves within a narrow area, having behind them a precipice and before them high walls crowned by several defensive stories, they could not extend themselves, their great number became an embarrassment; exposed to missiles in front and flank, their gathering at one point became a cause of sensible losses; while the besieged were well protected by their covered galleries dominating at a great height the base of the ramparts, had nothing to fear and lost but few men. A garrison of 300 men could hold in check ten times as many besiegers for several months. If after taking the two forts in the garden and the lower court of Pierrefonds, the besieger wished to attack the castle on the entrance side, it was necessary for him to fill up a very deep ditch enfiladed by the great tower I of the keep and by the two angle towers; his position was even worse, for 60 men fully sufficed at this point to man their upper defenses, and during the attack a troop making a sortie by the postern P could take the enemy in flank in the moat, either by the terrace E or by E". The master of Pierrefonds therefore, at the epoch when this castle was built, could consider himself protected from every attack, unless the king should send an army of several thousand men to blockade and conduct a regular siege. Cannon alone could subdue that fortress, and experience proved that the place was good against that powerful means of attack; Henry IV wished to reduce it; it was again in the hands of a leaguer named Rieux;[1] the duke of Epernon presented himself before Pierrefonds in March, 1591, with a great army and cannon; but he could do nothing there, and raised the siege after receiving a shot during a general attack repulsed by Rieux and some hundreds of guides, that he had with him. Yet this captain being surprised with a small number of his men, while he was engaged in highway robbery, was hung at Noyon, and the place of Pierrefonds under the command of his lieutenant, Antoine of S. Clermont, was again besieged by the royal army under the orders of Francois des Ursins, who did no better than d'Epernon. A great sum of money given to the commandant of Pierrefonds restored that fortress to the royal domain.[2]

Note 1.p.160. See the curious speech of this chief of a band, in the Satire Menippee.

directed with energy, a garrison lost its means of resistance even because of the quantity of obstacles preventing it from going in mass to the point attacked. The defenders were obliged to ascend and descend without ceasing, to open and shut a number of doors, to file singly in long corridors and narrow passages, and found the place taken before having been able to use all their resources. This experience certainly benefited the builders of fortresses at the end of the 14 th century; they erected curtains to protect themselves from scaliugs, no longer opened slots in the lower part of the works, but reinforced them by slopes, that had the further advantage of causing projectiles to rebound when falling from the machicolations; they placed the galleries and curtains in direct communication, so as to present at the top of the fortification an unbroken girdle of defenders, able to easily gather in mass at the point attacked and receiving orders with rapidity; they equipped the machicolations with solid parapets with battlements and covered, to protect them from projectiles thrown from outside. The galleries opening into the upper halls serving as barracks for the troops (buildings being then built against the curtains), the soldiers at any time and instantly could occupy the tops of the ramparts.

The castle of Pierrefonds exactly fulfilled this new programme. We have computed the number of men necessary to man one of the fronts of this castle. This number could be reduced to 60 men for the great fronts and to 40 for the small sides. N Now to attack two fronts at a time, it is necessary to assume a very numerous body of at least 2000 men, both to make the approaches and to force the lests, establish themselves on th the ground E E′ E″ outside the walls, to bring up the machines and protect them. The defense then had a great superiority over the attack. By the wide machicolations of the lower gallery, it could crush the pioneers, who desired to attach themselves to the base of the walls. For these pioneers to be able to commence their work, it would have been necessary to excavate mine galleries, or to construct covered passages of wood; these operations required much time, many men and much siege material. The towers and curtains are further reinforced at the base by a batter, that nearly doubles the thickness of t their walls, and the construction is admirable executed in g

the angle Z and the keep I. A very high watch tower rose above that on the corner. In spite of the multiplicity of these defenses, they could be manned by a relatively limited number of defenders, for they were orderly arranged, communications are easy, the curtains are well flanked by projecting towers close together, the rounds can be made on a level entirely around the castle in the upper part without being obliged to descend from the towers to the curtains, and to ascend from them in the towers, as one was compelled to do in the castles of the 12 th and 13 th centuries. It will be noted that no slots are pierced in the bases of the towers. Battlements on the external walls of the lists alone defend the approaches. The garrison, when driven into that first enclosure, took refuge in the castle, and occupying the upper stories and well protected by good parapets, crushed the assailants, who attempted to a approach the foot of the ramparts.

Bertrand du Guesclin had attacked many castles built during the 12 th and 13 th centuries, and profiting by the weak side of the defensive arrangements of these strong places, he most frequently placed ladders along the low curtains of the castles of that epoch, taking care to drive away the defenders by a storm of projectiles; he quickly assaulted and took places as much by scaling, as by the slow means of mines and saps.

We have indicated in the notes on the description of the L Louvre of William of Lorris, how the defense of the old castles of the 12 th and 13 th centuries required a great number of separate posts, each suspecting the others and keeping guard separately. This mode of defense was good against troops not acting together, and after a preliminary investment, proceeding by a series of partial sieges or by surprise; it was bad against disciplined armies led by a skilful chief, who abandoned methods pursued previously, and made a great effort at one point, taking isolated posts without allowing them time to find out, and to utilize all the turns and defenses arranged in the construction of the fortresses. To defend themselves well in the castle of the 13 th century, it was necessary for the garrison to not forget for an instant to profit by all the infinite details of fortification. The least error or negligence rendered these obstacles not merely useless, but even injurious to the defenders, and in an abrupt assault dir-

bottom of the valley. South of the lower court the plateau e extends horizontally, enlarges and is connected with a series of small hills in a semicircle concave toward the fortress. This location was bad for the castle from the time that artillery became an ordinary means of attack, for it permitted the south facade to be enveloped by a semicircle of convergent fire. Thus from the time of Louis XII, two earth forts, whose traces are still found, were built at the junction of the plateau w with the hills. Between these forts and the lower court beautiful gardens extended on the plateau, and they were themselves enclosed by terrace walls with parapets.

We have sought in vain the remains of aqueducts, that must necessarily have brought water into the enclosures of Pierrefonds. No trace of a well in that enclosure, no more than in the lower court. The supply of water was then obtained by means of conduits from the springs found on the slopes of the little hills adjoining the plateau. All that was necessary to the daily life of a numerous garrison and for its defense was too well foreseen to leave a doubt of the care devoted by the constructors to the execution of the aqueducts. It would be interesting to recover the traces of these channels by means of excavations directed by intelligence.

A cavalier view of the castle of Pierrefonds, taken from the side of the lists at the north (25) shows the entirety of its arrangement, which is very imposing today in spite of the state of ruin of the structures.

But what should particularly attract our attention in this magnificent residence is the system of defense recently adopted at that epoch. Each portion of the curtain is defended at its upper part by two stories of galleries, the lower story having machicolations, battlements and slots; the upper story under the roof had only battlements and slots. (Art. Architecture Militaire, Fig. 37). The tops of the towers preserved there, four or five stories of defenses, a gallery with machicolations and battlements at the level of the upper story of the curtains, one or two stories of battlements with intermediate slots and a parapet with battlements around the roofs. If one refers to a quite ancient illustration (16 th century) the tower e, built in the middle of the west curtain toward the city, possessed five stories of defenses, like those of

the ground of the lists, that is found 26.3 ft. below the gr-ound of the inner court. At p is a small postern closed only by folding doors. By this postern must the watch leave and r renter in case of siege and before the taking of the lists. To cause the door to be opened, the watch made itself known by means of a speaking tube at the left.of this postern, and which was divided into two branches in the thickness of the division wall, corresponding to the guard at h on the ground floor and that on the second story. Thus it was necessary for two separate guards to have recognized the watch, to cause t the door to be opened by men placed in a mezzanine located a about the space g at the middle of the story. But these meu did not hear the password spoken by those outside into the s speaking tube, and did not go to open the postern by descending a wooden stairs in u, only after having received orders from the upper guard. Besides in case of treason, the vaulted guardroom of the mezzanine, not communicating with the ground story of the court, would not have allowed the enemy to enter the castle, admitting that he had succeeded in surprising this post. Once the passage was entered by the postern p, it was essential to take into account the internal arrangement of t the castle; for to reach the court, it was necessary to follow on the left the corridor s, to turn beneath the east wing, a ascend by the little winding stairs t, pass over a drawbridge quite high above the court Q, and to appear before the gate X, closed by folding doors and a portcullis. If a hostile force entered by the postern p, three passages presented themselves, two of which, the corridors r and k, had no outlets; thus it risked straying and losing precious time.

Note 1.p.185. See Art. Prive.

If the defensive arrangements of the castle of Pierrefonds do not have the majestic grandeur of those of the castle of Coucy, they do not fail to be combined with an art, care and attention to details, that proves to what a degree of perfection the construction of strong places for lords had arrived at the end of the 14 th century, and to what point their possessors in that epoch mistrusted people outside.

The lists E E′ E″ were formerly equipped with battlements, destined to place cannon at a more recent epoch; they dominated the natural precipice, that is about 66 ft. above the bot-

designated by the name of "cartre" during the 13 th and 14 th centuries. (Old French poem).

What strengthens our opinion is, that the great hall a served as a court of justice according to custom (its bar being placed at a'). Culprits cited before the lord's tribunal were brought from the guardhouse M into the waiting room b, without being able to enter the court of the castle, since the portcullis of the passame L is placed beyond the entrance of the guardroom. It was indeed an important point, that no person but the garrison should at that time benetrate into a castle, except by special permission. After having been tortured in t the tower e joining the great hall, if the accused were found guilty, they were brought before the platform a' to hear their sentence, and from thence were taken to the corner tower c to be imprisoned either in the hall in the ground story, in the cellar, or finally in the dungeon just described, according to the rigor of the punishment to be suffered. If they w were found innocent, they left through the guardroom as they entered, without being able to give the least details relating to the internal arrangement of the castle, since they had only seen the tribunal and its dependances.

The great hall a and the annex b occupied the entire height of this wing. The tower e was equipped with five stories of defenses, flanked the curtain and commanded the exterior of the lists.

The garrison lodged in the north wing, and in the ground story the kkitchens very probably were arranged at l. A great winding stairs f ascended to two stories of this wing above the ground story. The tower g contained large privies in each story, which indicates a numerous garrison at this point. These privies are ingeniously arranged to avoid odor. They have in the lower story a large vault with a lateral passage for removing the sewage and a ventilating duct.(Art. Prive). A g guard was placed in the room h. The two towers J, J', best preserved of all the castle, are admirable in construction a and defensive arrangements; all their stories, except the cellars, have fireplaces. Two other halls reserved for the garrison are situated at m. By the hall n one descended to the v vast cellars extending beneath the west wing. We give at B the plan of the lower story of the north wing at the level of

to the upper defenses of the great tower I and receiving them. The two principal entrances of the castle at G and V were thus strongly protected by very high and powerful works, and the two southwest and northeast angles of the keep, being well s supported an flanked, covered its mass. As for the southeast and most exposed angle, it was preceded by a very high tower Z possessing a watch tower and five storier of defenses. It was not by its own construction that the keep of Pierrefonds, the residence of the lord, was defended, but by the important additions surrounding it.

Note 1.p.152. The flights of steps plan an important part in castles after the 13 th century.(Art. Perron).

The other parts of the castle of Pierrefonds are no less interesting to examine. The great hall was at a, covered by carpentry with visible tiebeams according to custom. A wide fireplace heated it. The great hall was in communication with a second hall b, from which one reached the corner tower c. The construction of this tower is very singular, and we think that it may be regarded as intended for dungeons (oubliettes). There is no castle in which the guides do not show you dungeons, and generally these are privies, that are accused of having received human victims sacrificed to the vengeance of the feudal nobles; but this time it seems difficult for us not to s see actual dungeons in the construction of the southwest tower of the castle of Pierrefonds. Above the ground floor is a story covered by cross vaults, and below it is a cellar with a depth of 23 ft. covered by an elliptical segmental dome. O One can descend into that cellar only through an opening pierced in the upper part of the vault, i.e., by means of a ladder or knotted cord; at the centre of this circular cellar is excavated a well, that appears to us to be 26.3 ft. deep, although partly fallen in; a well with an opening 5.3 ft. diameter corresponding to the opening in the centre of the elliptical vault of the cellar. This cellar receives neither air nor light from the exterior, but has a privy in the thickness of the wall. It was then intended to receive a human being, and the well excavated at its centre was probably a grave always open for the unfortunate, who was desired to disappear forever.[1] (Art. Oubliettes).

Note 1.p.1-4. This sort of tower serving as a prison was d

buttress S at the angle of the keep on the principal court was probably terminated by a watch tower, a sort of small guardroom that commanded the entrance corridor L. The grand stairway P, on the side most in sight next the court, was preceded by a wide flight of steps and a box or portico, that permitted the lord and his principal officers to draw up the garrison in the court and give orders from an elevated point.[1] The arrangement of this flight of steps must be modified; we have reason to believe, that at the origin it was only a terrace with a small stairway placed at the side. An important annex of the keep of Pierrefonds is the square tower O placed at t the northeast angle, it is flanked by buttresses supporting watch towers, which permit seeing what passes in the country, over the curtains T, the only one not adjoined by buildings, for the area Q is a court. At V the curtain T is pierced by a wide postern equipped with folding doors and a drawbridge; the threshold of that postern is placed at 26.3 ft. above the external base of the wall. Outside that base the slope of the plateau being quite steep, it is scarcely possible to admit, that a level bridge might give access to the postern, although opposite and about 164 ft. from the rampart exists a hill partly artificial, and that seems to have been surmounted by a little fort. We should be disposed to believe that the postern V had one of those projecting bays quite frequently employed in castles for admitting provisions of all kinds by means of a windlass, without being obliged to admit persons unknown to the garrison into the internal enclosure; in this case the little fort on the hill outside was intended to mask and protect the introduction of provisions. As an excess of precaution, the northeast battlements of the tower O, connected with the chapel Y, is pierced by a doorway equipped with folding doors and a portcullis. If then it was necessary to admit strangers into the court Q to provision the castle, these could not penetrate into the internal court or even see what occurred there. We shall soon see the twofold utility of this door X. The square tower possessed five stories above the ground story with levels differing from the floors of the keep, and not communicating with it, as we have stated, only by bent o passages and stairs. This was a work that could be isolated at need, commending the outside by its height, giving signals

story of a high square watch tower, furnished with its little private stairs and with privies V in all stories. By itself t this entrance is well defended, and the carriage gate of the external defense being opened, it was impossible for men in the lower court to see what occurred in the internal court of the castle. But what rendered that entrance particularly difficult to force was the great tower I of the keep, whose walls of a considerable thickness (15.1ft.) in the ground story are not pierced by any opening, and whose upper machicolations permit crushing assailants in possession of the bridge or moat. The tower I is joined to the keep proper of square form, and divided in several halls, and that by its position commands afar the two sole accessible points of the castle, i.e., its south and southeast facades. But the construction of this keep merits that we study it with care, so much the more that it differs from those of the 12 th and 13 th centuries.

Note 1.p.150. This plan is at a scale of 1 : 1000.

At Pierrefonds the keep is not only the principal point of the defense, it is also the habitation of the lord, constructed with elegance, and containing a great number of services adapted to render the apartments pleasing. It consists of a story of cellars, a vaulted ground story whose plan is given, that could only serve for storehouses and places for provisions, and three stories of halls furnished with fireplaces. In each story the arrangement is like that of the ground story; but the halls are separated by floors and no longer have the columns seen on our plan. From the principal halls of the upper stories, reached by the grand stairway P, are communications with the square tower O by passages made in the angle of the junction, and these principal halls were lighted by two large and high windows pierced in the eastern wall at each side of the fireplaces. This keep was covered by two roofs with intermediate gutter on the division wall from east to west. Two gables at the east and two at the west close these two roofs. Between the keep and the southeast tower were great privies J reached by a bent passage; between these privies and the little hall southeast of the keep is a closet lighted from the court Q. From this same southeast hall at the l level of the cellars is a passage to a little postern R opening on the moat and the stairs of the corner tower. A great

on the north, thus found itself dominate a magnificent domain easily guarded on all sides, having at its gate one of the m most beautiful forests in the vicinity of Paris. It was thus an admirable place, able to serve as a refuge and to offer t the pleasures of the chase to the possessor. The court of Charles VI was very advanced in luxury, and among the great vassals of this prince, Louis of Orleans was one of the most magnificent lords, loving the arts and cultured, which did not prevent him from being full of ambition and love of power; so he desired his new castle to be both one of the most sumptuous residences of that epoch, and a fortress built in a manner to defy all attacks. Monstrelet speaks of it as a place of the first order and an admirable location.

Note 1.p.149. Compiègne et ses environs, by L. Ewig.

The castle of Pierrefonds, whose plan we give (24) at the level of the ground story of the court,[1] is both a fortress of the first order and a residence containing all the services designed to provide for the existence of a great nobleman and a numerous assemblage of knights. Separated from the plateau at the end of which it is located by a ditch A cut in the rock by man, its principal entrance G is preceded by a vast lower court C, around which rose the stables, cattle sheds and the lodgings of the servants. At C is still seen the circular watering place for cattle and horses. The entrance gate of t the lower court was opened in the eastern enclosing wall. The three sides, north, west and east of the castle dominate very pronounced slopes, at the foot of which extends the town of Pierrefonds. To enter the castle, it was necessary to pass a gate opened at the end of the wall of the lists at about the point D, follow beneath the ramparts the terraces E, and enter by the eastern gate from the lower court at F, traverse t the lower court diagonally, and present one's self before the entrance G with carriage portal and a rectangular postern opening at the side. This first defense being passed beneath t the enormous tower I of the keep, that commands it vertically, one finds himself on a wooden bridge supported by two isolated piers, and arrives at the drawbridges H and K of the gate and the postern. Besides the drawbridges, the entrance passage L had two gates and a portcullis falling behind the little gate of the guardroom M. This guardroom occupied the ground

to men making a profession of arms, i.e., to all those moved by the same interests and the same tastes; that is why the c castle of the end of the 14 th century takes the appearance of a fortress, more than before that epoch, although the feudal power may have lost the best part of its prestige. The castle of the beginning of the 15 th century protests against the popular tendencies of its time, it is more isolated and enclosed than ever; defenses become wiser because only occupied by soldiers. It is no longer a protection for the country, but a refuge for a privileged class, that feels itself attacked on all sides, and that makes a final effort to seize on p power again.

In the 12 th century, the castle of Pierrefonds, or rather of Pierrefonts, was already a military post of great importance, possessed by a count of Soissons named Conon. At the death of this lord without heirs, it was acquired by Philip August, and that prince had entrusted the administration of the lands to a bailiff and a provost, abandoning the use of the seigniorial buildings to the religious of S. Sulpice. By reason of this acquisition, the leading men of the town had obtained from the king "a charter of a commune that prohibited t the exercise of the rights of servitude, mortmain and marriage, and in recognition of this immunity, the citizens of Pierrefonds must furnish to the king sixty sergeants, with a carriage drawn by four horses."[1] Because of this dismembering of the old domain, the castle was little more than a rural habitation; but under the reign of Charles VI, Louis of Orleans, first duke of Valois, judged it well to extend his safe places, and in 1390 he took up the duty of rebuilding the castle of Pierrefonds on a stronger and better selected site, i.e., at the end of a promontory dominating one of the richest valleys in the suburbs of Compiegne, profiting by the natural precipices to protect the defense on three sides, while the old castle was placed on the plateau at about 1640 ft. from the precipice. The good location of the place was not the only reason, that must have determined the choice of the duke of Orleans. If o one looks at the map of the vicinity of Compiegne, it is seen that the forest of the same name is surrounded on all sides by streams of water; the Oise, Aisne and the two small rivers of Vandi and of Automne. Pierrefonds, sheltered by the forest

it is well to examine with an unprejudiced eye those laws filled with minute details on the preservation of the feudal domains. These laws are generally dictated by prudence, by the need for preventing the waste of the riches of the soil. If today in spite of all care of the government armed with protective laws, under an administration extending everywhere, it is difficult to prevent abuses in the division of property, into what disorder would the culture of the country have fallen in the middle ages, if feudalism had not been interested in maintaining the privileges of the possessors of lands, privileges attacked with more passion than reflection, by a feeling of envy rather than a love of the general good. If these privlieges are forever destroyed, if they are contrary to the national feeling, which we recognize; if they cannot find place in our modern civilization, let us at least state this; that they were not only profitable to the great proprietors of the soil, but to the soil itself, i.e., to the country. Let us then leave aside the vulgar discourses of the belated detractors of overthrown feudalism, who see in each feudal lord only a petty tyrant occupied in excavating dungeons, those of their friends, that wish to represent these barons as knightly defenders of the oppressed and protectors of their vassals, crowning rose queens, and always ready to mount a horse for God and the king; but let us take feudalism for what it was in France, an energetic stimulant, one of those providential elements, that concur (blindly, it matters little) in the grandeur of our country; let us respect the ruins of their dwellings, for it is perhaps to them we owe having become the most united nation in the West, that whose strength and intelligence have affected and will long continue to affect the d destinies of Europe.

Let us now examine this last phase of the feudal habitation, again brilliant, which commences with the reign of Charles VI.

The political situation of the nobleman was changed; he could no longer count on the service of his men in the villages and the country, as in the fine time of feudalism (they having manifested their profound hatred of the feudal system; he knew that their forced assistance would have been more dangerous than useful; he must therefore trust to his direct vassals, to the knights holding fiefs dependant on the lordship, and

it taught the people of cities the art of fortification; compelled them to protect themselves, it further retained certain principles of chivalrous honor, that nothing could efface, which elevated the aristocracy during the 16 th and 16 th centuries, and that gradually penetrated into the lowest classes of society.

It is with the education of peoples as with that of individuals, who when endowed with a robust temperament, learn life better under whimsical, hard and even unjust masters, than in the endulgent and paternal hands of the family. Under the reign of Charles VI, feudalism defended the country badly, even betraying it, fortifying itself more than ever in its domains, having no views than satisfaction of personal ambition, devastating the country and the cities under pretext of harming s some party, placed arms in the hands of the people, and Charles VI found them armed.

If the French provinces had passed from monastic influence under an absolute monarchical rule, they would certainly have had a more happy and tranquil youth; their gathering under the latter power might have been made without a violent shock, but would they have felt that ardent need of union, of national u unity, that forms our strength today and tends to increase e every day? It is doubtful. Feudalism further had an immense advantage among a developing people; it maintained the feeling of personal responsibility, that monarchical power on the contrahy tends to extinguish; it accustomed each individual to combat; it was a hard, oppressive and vexatious regime, t though healthy. It seconded the royal power in compelling the people to unite against the divided owners of castles, to form a nation.

Among the feudal laws that appear barbarous to us, there w were many good ones, whose wisdom we must recognize, now that we have destroyed them. The inalienability of the domains, t the rights of hunting and fishing among others, were not only advantageous to the lords, but they preserved vast forests a and numerous ponds, whose clearing and drainage became the c cause of incalculable disasters for the territory, by causing for us those inundations and periodical drouths, that begin to affect minds disposed to find everything for the best in our present reorginization of the country. In that respect

general dissolution unless one succeeded in establishing in the midst of that chaos principles of obedience and absolute authority, based on the sole higher power that was not disputed, that of God. (Art. Architecture Monastique). Soon indeed the monasteries, that enclosed the best of the people, were not only a model of government, and the only one, but they extended their influence outside of cloisters and participated in all great religious and political affairs of the West. But because of its instruction, the monastic spirit could maintain, control and oppose a powerful restraint on that disorder; it could not constitute the life of a nation, and its duration would have enclosed civilization within an impassable circle. Each religious order was a centre from which one wandered only to fall again into barbarism.

At the end of the 12 th century the monastic spirit was already in its decline; it had fulfilled its task. Then the lay element was developed in populous cities; bishops and kings offered in their turn a rallying point in building the great thedrals. (Art. Cathedrale). Another danger, for it is to be feared that the royal power, seconded by the bishops, might subject this society to a theocratic government, unchangeable like the ancient government of Egypt. Then feudalism assumes a political part, perhaps unconsciously, but which is no less important to recognize. It casts itself between royalty and t the clerical influence, preventing these two powers from combining in a single one, placing the weight of its arms in one scale of the balance, sometimes in the other. It oppresses t the people, but forces them to live; arouses them, combats or aids them, but then compels them to know themselves, to combine, defend their rights, discuss them, and even appeal to force; gives them the custom of resorting to the royal tribunals, drives the common people to the study of law; even by its excesses, it arouses the indignation of the oppressed against the oppressor. The envy caused by its privileges becomes an energetic stimulant, a ferment of salutray hatred, for it prevents the lower classes from forgetting their precarious condition for an instant, and forces them to attempt daily to free themselves from it. Better still by its struggles and m mistrust, feudalism maintained and sharpened the military spirit in the country, for it knew only the strength of arms;

on the day of Agincourt, corrupt, accustomed to luxury, loved best to shut itself within good fortresses, elegantly built and furnished, than to take the field.

"The good olf fighters," again says Alain Chartier in his verses full of energy and of honesty of heart.[1] (Old French poem).

Note 1.p.145. Livre des quatre Dames. Edit. 1617.p.665.

Then romances of chivalry were much im fashion; men loved festivals, tournaments, reviews; each petty lord under that monarchy in ruin regretted the concessions made, desired to make himself important, to reconquer all the land lost in two centuries, not by services rendered to the State, but by lending his aid to the one offering most, dividing the remains of the royal power, oppressing the people, pillaging cities and the country, and to ensure impunity, the barons covered the soil with castles defended better than ever. The manners of the nobles then presented a singular mixture of chivalrous r refinements and of brigandage, of courtesy and of shameful b bargains. Beyond a certain point of honor, and a romantic gallantrw, they believed everything permitted toward the State, which did not exist in their eyes, and the people that they affected to scorn the more, because they had aleeady been forced to reckon with them. Thus is to be dated from this moment that the popular hatred against feudalism acquired that active energy, transmitted from generation to generation, that broke out in such a terrible manner at the end of the last (18 th) century . A hate too well justified,it must be said! But these last times of chivalrous and corrupt feudalism, egotistic and refined, must it prevent us from recognizing the immense services, that the feudal nobility rendered during the preceding centuries? Feudalism was the temper of the national spirit in France; and that temper is good. Today that the feudal castles are destroyed forever, we can be just toward their ancient p possessors; we do not have to examine their intentions, but the effects and results of their power.

In the 11 th centuries the monasteries attracted everyone to them, not only refined souls chilled by the frightful disorder, that existed everywhere, minds saddened by the view of a barbarous society, where nothing was certain, whose brutal force made the law, but also grand characters, who foresaw a

living on their domains. Once that the revenues of the lands were limited and established by charters confirmed by the king, it was necessary to consider limiting expenses, reducing costly garrisons, to take up life in relation to the amount of f fixed rents, and which the subjects were not disposed to increase. On the other hand, the taste for luxury, for pleasant residences had increased among the barons, as well as the need for impressing the people by a respectable state of defense, for the boldness of subjects to which one is compelled to make concessions increased by reason of the extent itself of these concessions.

The more a nation tends to unity of power, the more feudalism was opposed to that principle by its own organization, and sought in its castles to form an isolated society in permanent opposition to every act emanating either from the king and h his parliaments, or from popular sentiment. Not being able to stop the current established after S. Louis, and not wishing to follow it, the lords sought at least to place obstacles to it by all means in their power. Under princes whose hands were shut, and their acts were dictated by extreme prudence, that permanent consipiracy of feudalism against unity, order and d discipline in the State, was not dangerous, and betrayed itself only by grumbling soon suppressed; but if the royal power fell into weak hands, feudalism recovered its instinct for d disorganization with its pretensions, arrogance and egotism, its contempt for discipline, its rivalries injurious to public affairs. Brave separately, feudalism acted before the enemy of the country in battle array, as if it had been cowardly or traitorous, often sacrificing to its pride the most sacred interests of the nation, Conquered in the open country by its o own fault, it took refuge in its castles, built new ones, caring neither for the honor of the country nor the independence of the sovereign or the disasters to the nation, but acting according to its personal interests or its caprice. This representation of feudalism under the reign of the unfortunate Charles VI is not intentionally darkened, but is the faithful image of that sad epoch. (Old French text from Alain Chartier).[1]

Note 1.p.144. Le Quadrilogue invectifs. Edit. 1617. p.447.

This undisciplined nobility that had scarcely retained of the ancient feudalism more than its pride, who fled in part

and by this the said lands are and in great part remain uncul-tivated, not worked and fallow, wherefore our said lands are very much less valuable; and to destroy and annul that servi-tude in times past our ancestors, lords of Coucy and especial-ly our very dear and beloved father, whose soul is with God, was requested on the part of the inhabitants for the time on said land, in offering by them a certain perpetual revenue. And since we have become of age and have full enjoyment of o our said lands, the inhabitants of our cities on the said la-nds have come before us several times, requesting that the said custom and wage should be destroyed and annulled, and o our said lands and cities, all inhabitants present and future residing therein, be freed from the said servitudes and all personal tasks whatever for all time perpetually, offering us from each city or for the greater part of the said cities a certain rent and revenue of silver perpetually for us, our s successors, etc. We free from all mortmain and outside marri-ages, and give them full and entire freedom, and to each one of them perpetually for all time, both to become clerics as well as to have all other states of freedom; without retain-ing servitude to us nor power of acquiring any servitude over them. All the said things stated above we have done and will do, if it please the king our lord, which lord we supplicate inasmuch as we can, to increase and benefit the fief that we hold from him, as stated above, that he will confirm, allow and approve of the things stated above. The year 1368 in the month of August." The king confirmed this charter in the fol-lowing month of November.[2]

Note 1.p.143. Fourmariage, formariage, a tax that a serf w was compelled to pay his lord for permission to marry a free woman or a serf of another lord.

Note 2.p.143. Hist. de Coucy-le-Chateau, by Melleville; Laon. 1848.

Necessity alone could comple the feudal lords to grant these charters of enfranchesement, that indeed ensured them fixed r revenues (for the subjects of market towns, cities and villa-ges only obtained them by paying the lord an annual rent),but took from them the rights that they frequently abused, and put an end to resources of all kinds, that in the condition of p pure feudalism, the barons knew how to find among the people

enclosures, flanked by some small and isolated towers, protected by a keep and containing only buildings of little importance, but are noble and spacious residences built against very high curtains, well flanked by towers near each other and formidable, connected by covered ways, and likewise equipped with good defenses entirely around them. The keep relies on the c castle, no longer being a residence dominating the others, wh whose masonry is thicker and better protected; the entire castle becomes like a vast keep built with great care in all its detail. Already the system of isolated defense loses its importance, the lord appears to distrust its garrison less, for he is compelled to reduce it as much as possible, and to gain by the defensive arrangement of the whole, what he loses in men. Necessity is the law, after the frightful disorders that ensanguined France, and particularly the provinces adjoining Ile-de-France about the middle of the 14 th century, after t the revolt of the peasants (Jacquerie) had been suppressed, the country, villages, and even the small cities were depopulated; the inhabitants had fled to the cities and enclosed market towns. When quiet was restored, the lords returning from campaigns or English prisons found their lands abandoned, therefore their resources being reduced to nothing. The cities enfranchised the peasants, who had taken refuge behind their walls, from the servitude of mortmain, from levies and v vexations of all kinds to which they were subject on the lands of the nobles. The barons were compelled to make concessions for repeopling their lands, i.e., to offer their refugee subjects and those threatening to abandon their domains, the advantages that they found in the cities. Thus Enguerrand VII, lord of Coucy, returning to France after being sent to England as a hostage for the ransom of king John, saw himself compelled to accord to twenty two market towns and villages holding from his castle, a general charter of enfranchisement. This charter, whose text is preserved, clearly explains the motives causing it to be granted; here are several passages. "Which persons (our men and women of mortmain and of outside marriages (fourmariage)) [1] by goint to reside outside our said lands in certain places, freed themselves without our consent, and could become free at all times they pleased; and for hatred of that servitude some persons abandoned residence on our said lands,

in his youth, the excessive power of the great vassals. While he sought by new arrangements to forever drive away a danger, that nearly caused him to lose the crown of Philip August; w while he ruined his barons, infringed on their rights and made it impossible for them to erect fortresses, he ceded a part of the French provinces to king Henry III of England for entirely personal considerations, whose value it is now difficult to recognize. In the eyes of history this concession was a grave error, perhaps the only one committed by this prince; a hundred years later it had disastrous results, and caused the long reverses in France during the 14 th and 15 th centuries; contrary to the tendencies of him who had committed it, it again had the result of prolonging the existence of feudalism; for during these disastrous wars, these troubles and incessant ferments, the nobles resumed their character of chiefs of bands, sold in turn their services to one or the other party, sometimes to both at the same time, regained that independence and isolation, that domination without control, that under the last Carlovingians had led them to shut themselves within those impregnable residences, in order for them to devote themselves to all sorts of misdeeds and aggressive acts. After a first terrible crisis, France under Charles V again found peace and prosperity for several years. On all sides the nobles knew what they had to fear from the people by the Jacquerrie, and from the increasing predominance of the inhabitants of cities, thought of placing their residences in condition t to resist popular revolts, the encroachments of royalty, and the periodic invasions of foreign enemies. Already accustomed to luxury and an affected life, the nobles that erected castles toward the end of the 14 th century, modified their ancient habitations by giving them an appearance less severe, were pleased to introduce sculpture in them, making the residence buildings more extensive and commodious, surrounding them with gardens and orchards, modifying the defensive system so as to resist more efficiently external aggression with less numerous but more disciplined garrisons. In that respect, the castles of the end of the 14 th century are very remarkable, and the cities through which feudalism must pass had caused notable progress in the art of fortifying its residences. These are no longer as in the 12 th century, quite low and extensive e

stubborn, the besieged only surrendering after having received 1260 cannon shots. The towers of the castle of Villandraut are 38.6 ft. high, exclusive of the destroyed battlements, with diameters of 35 to 40 ft.; they are much higher than the curtains, whose thickness is 8.9 ft. This plan appears to have been frequently followed from the second half of the 13 th c century for castles of moderate extent in a plain; yet the i importance attached to the defense of the gates (the point to which tended all the efforts of the assailant before cannon) caused, that men were not alone contented with flanking towers, and that a little isolated fort was built in front in the middle of the moat. Thus was defended the gate of the castle of Marcoucies, erected under Charles VI by Jean de Montaigu. These little forts replaced the old barbicans of the 12 th and 13 th centuries, that most frequeutly were only works of earth and timber, and in their turn were replaced at the end of the 15 th century by ramparts of earth with or without facings, built to receive cannon.

Note 1.p.140. M. Jules Quicherat has found in the province of Burgos (Old Castile) a village, that bears the name of this castle made celebrated in the 13 th century by the sojourn t there of archbishop Bertrand de Goth, after causing it to be rebuilt. According to M. Quicherat, at the beginning of the 13 th century a junior of Biscay, Don Alonze Lopez, in possession of Villandraut (Villa Aldrando) had two sons, of which the younger, Don Andrew, came to France in the suite of Blanche of Castile, and stopped in Guienne near Bazas, in the place that has retained the name of Villandraut. Half a century later, the marriage of the daughter or granddaughter of Andrew with a member of the family of Goth caused this lordship to pass into that house and even into the possession of him, who at first was archbishop of Bordeaux, and was soon elevated to the throne of S. Peter under the name of Clement V. 1306-1313. Comm. des mon. Hist. de la Gironde.

Under Philip the Bold, Philip the Fair and Philip of Valois, the arrangement of castles was little changed; France did not have to contend against foreign invasions; it was strong and powerful; the feudal nobility appeared resigned to allow the monarchy to take a greater place in the State. S. Louis had only one danger to the throne; it was what he had to combat

rather to the defense of cities and of strong places of that epoch, than to that of castles.

Note 2.p.139. What again proves that the place of Vincennes was not regarded by its founder as a castle is this passage of Cristine de Pison, an extract from his Livre des faits et bonnes moeurs du sage Roy Charles V. "Item, outside Paris, t the castle of the wood of Vincennes, that is very notable and fine, where the king had the intention of making an enclosed city, and there had established in fine manors the residences of several nobles, kinghts and others of his best friends; a and to each one he assigned these rent free for life according to their rank; this place the king desired to be free from all servitudes, to demand no change in future time nor rent." Chapter 11.

One of the characters peculiar to castles of the end of the 13 th and the 14 th centuries, is the relative importance of towers, that with rare exceptions are cylindrical, of great diameter, thick masonry, high and strongly projecting beyond the curtains, so as to flank them well. Machines for attack being perfected in the 13 th century, it was judged necessary to increase the diameters of towers, to make their walls thicker, and to make them very commanding. This observation again confirms our opinion of the date of the defenses of the Louvre. If Charles V had rebuilt them, he would certainly not have retained those towers of small diameters and largely engaged in the curtains.

The castle of Villandraut near Bazas, built about the middle of the 13 th century, already shows us very strong towers projecting from the curtains, flanking at each angle a parallelogram 156 × 128 ft. inside. This castle has already been published by the Commission of Historical Monuments of the Gironde, from which we give the plan (23), and is perfectly regular, like nearly all castles in the plain; its side entrance is flanked by two very strong and thick towers; barracks were arranged in the interior along the four fronts, so as to leave a court about 82 × 98 ft.[1] Here is no keep, or rather the castle itself forms an actual keep surrounded by wide and deep moats. The dependances and probably the external enclosures protected that fortress, which was very well defended for that epoch, since in 1592 the leaguers being in possession of the place, marshal de Matignon must lay siege, that was long and

feathered arrows and darts; further a shop where were roughed out darts and arrows, with an armory with three sides, length 5 fathoms, 7 ft. high and 2 1/2 ft wide, where were stored c coats of mail, shields, helmets, axes, swords, spear heads, archegays and a quantity of other kinds of arms necessary for the garrison of the Louvre." Thus in the 14 th century, a castle must contain not only what was necessary for daily life, but numerous shops for making and repairing arms; it must suffice for itself without need of resorting to furnishers outside. Like an abbey in the 12 th century, the feudal castle f formed an isolated community, a little city containing its soldiers, workmen, fabricators and its special police. A royal residence, the castle of the Louvre, like all feudal castles, had in its lower courts farmers, who by their leases must supply poultry, eggs and wheat; it further possessed a menagerie built by Philip of Valois in 1333 on the site of barns purchased from Geoffry and Jacques Vauriel; beautiful gardens planted in the fashion of the time, i.e., with trellises, rose bushes, arbors, lawns and quincunxes.[1]

Note 1.p.139. When Charles V desired to do the honors of t the Louvre to the emperor Charles IV, he had that prince taken there in a boat; they arrived at the Louvre; the king showed the emperor the beautiful walls and masonry, that he had caused to be constructed at the Louvre; the emperor, his son and his barons might well lodge there, and the place was very richly furnished, in the hall dined the king with the barons, and the emperor in his chamber." (Des faits du sage Roy Charles V. Cristine de Pisan. Chapter 42.

The plan of a square or parallelogram appears to have been adopted for feudal castles in the plain from the 13 th century; but it is rare to find, as we have previously stated, the keep placed at the middle of the rectangle; this arrangement is peculiar to the castle of the Louvre. At the castle of Vincennes built during the 14 th century, the keep is placed on one of the longer sides, and therefore it could make itself independent of the enclosure by having its postern open directly to the outside; but it is necessary to see in the castle of Vincennes a strong place, a vast fortified enclosure, rather than a castle properly so called.[2] (Art. Architecture Militaire). The square towers that flank its curtains belong ra-

that protected the exterior of the castle, and the care taken by Charles V in the reconstruction, it also shows how the towers of Philip August must have been affected by raising the curtains serving as external facades for the new buildings. On the north is perceived the stairway of Raimond du Temple and the rich buildings to which it gave access. On the east side on the front of our drawing passes the enclosure of the city built by Philip August, terminated at the Seine by a high tower, that remained until the beginning of the 17 th century; behind this tower are the two gates, one giving entrance into the city along the first enclosure of the Louvre, the other entering that enclosure. This front of the enclosure of Paris, built by Philip August necessarily defended itself from the exterior to the interior, from the Seine to the barrier of the sergeantry; i.e., most of its curtains and towers were excavated on the side next the city and not on that of the Louvre. This portion of the enclosure thus depended on the castle and protected it against the undertakings of the inhabitants.

From the time of Charles V the castle of the Louvre and its dependances contained everything necessary for the life of a prince. Sauval says, "there were the house of the oven, the panneterie, the sausserie, the epicerie, the pastry room, the larded, the fruitery, the echanconnerie, the bottling room, the place for making hippocras. There were found the bakery, linen room, furriery, laundry, tailors' room, wood room, charcoal room; further the doorkeeper's room, police room, falconry and the artillery, besides a number of cellars, poultry yards, and other apartments of that nature." The buildings of the artillery were situated at the southeast and had great importance; they are indicated on our plan (Fig. 20) by F, G, T. "In the accounts of the bailiffs of France rendered in the chamber in 1296," says Sauval, "there is frequent mention of hides and sinews of oxen, and of crossbows kept in the artillery of the Louvre. When the Parisians took possession of the Louvre in 1358, they found thise machines, cannons, wheel lock muskets, levers and other artillery in great quantity." The master of artillery was lodged there, had a garden and stoves; in 1391, although cannon were already known, they were rarely employed for the defense of strong places. "There was also," adds Sauval, "at that time a chamber for the women that feathered arrows and darts; further a shop where were roughed out

belong to the construction at the beginning of the 13 th century. The chapel was at a; at m was a great vestibule serving as guardroom. The apartments of the queen occupied the wing h, c, e, f, k; the tennis court the hall g. The building V c contained the menagerie, and F T Q the artillery service after Charles V. What was the pride of Raimond du Temple was the wi winding stairway E, that passed for a masterpiece, an open c construction ornamented by niches and statues representing t the kings of France; then the gallery D connecting the keep with the second story of the north wing.

In the second story (21) the chaber of accounts occupied D over the principal gate; the hall of jewels (the treasury of Charles V was very rich in articles of gold and silver) was placed at A over the guardroom, the library being in the little tower B.[1] The cabinet of the king was at C; the chamber of requests at E; the bedchamber of the king was at F, his o oratory at G; a cabinet and bathroom at H H. The tennis court occupied the heights of the ground and second stories at I. An upper chapel M was over the lower chapel, the latter being reserved for the men of the castle. At N the king had a second bedroom, preceded by an anteroom P, an oratory O, a bathroom and cabinet R R. The state hall (of the throne)was at Q, and the great hall named after S. Losis was at S. There existed an apartment of honor with the hall of state in V, X and T. The second story of the keep L was divided in four rooms, containing a chamber, oratory and cabinets. The galleries or porticos Y served as communications for service, and as we have already said, the gallery K gave admission to the second story of the keep.

Note 1.p.136. The library of Charles V was extensive and r rich; in this little round hall was found one nucleus of the Library Imperial.

By means of the painting of S. Germain-des-Pres, the engravings of Israel Sylvestre, and a drawing from the beginning of the 17 th century in our possession, we have attempted to restore a birdseye view of the castle of the Louvre of Charles V; we give it here (22). The view that we have chosen is that from the southeast, for on that side of the Louvre can be gathered more documents preceding the reconstructions of the 16 th and 17 th centuries. Our view shows the series of defenses

these employed from the time of S. Louis. Yet Charles V raised the curtains and built habitations against them (this is Sauval's opinion); he caused the building of the grand stairway and the gallery placing the keep in communication with the n north gate. Perhaps he relieved the perimeter of the castle of Philip August from the side J toward the west by erecting at at that point very deep lodgings. It would seem that the primitive structures stop on this side at the tower Z, and t that the enternal wall of the western wing was the old curtain. Then the keep was near the curtain and could better command the country near the point at which a serious attack was most to be feared. The structures undertaken by Charles V were entrusted to Raimond du Temple, his well beloved sergeant at arms and mason."[1]

Note 1.p.134. This plan is reduced from that given by count de Claroc in his Musee de Sculpture, ant. et mod. 1826-1827.

Note 1.p.135. See the Titres concerning Raimond du Temple, architect du roi Charles V. Lib. Ecole des Chartres. 2. Series. Vol. 3. p. 55. Raimond du Temple combined near Charles V the functions of sergeant at arms and master of the works, and the titles here mentioned make known the feeling of esteem, that the king of France professed for his body-guard and architect.

The gate of the city (Fig. 20) afforded exit between two wa walls flanked by little towers beside the river, and terminated in a first external gate K opening on the hill, at the point where is now found the balcony of the gallery of Apollo. Beside this gate was the tower of Bois, that corresponded to the tower of Nesle on the site of the Institute. From the city one entered the external enclosure of the Louvre by the gate H; this was the principal gate. But to enter the castle, it was necessary to pass through a little fort N built outside the ditch. The tower I formed the angle on the Seine nearest Paris. At A was the keep of Philip August, surrounded by its own moat B; its entrance was protected by a guardhouse G. At F w was a fountain. A wide moat U with faced counterscarp, covered way and turrets extended entirely around the castle. The lower courts next the city were found at R between the wall of Philip August and the moat. On the north side at W and on the terrace O were planted gardens with trellises. The angle towers X and the principal gate with its two towers Y must

unwilling to honor artillery by recognizing it; in the construction of their castles, they persisted in not taking it into account, up to the moment when its terrible effects destroyed this vain protest by means of several volleys of cannon balls.[1]

Note 1.p.133. Have we not also seen at the end of the last (18 th) century the French nobility act in the presence of great popular disturbances just as it acted two and a half centuries earlier in presence of artillery?

But we have not yet arrived at that epoch of transition, wh when the castle is no more than a vain phantom of military defense, and still conceals by a remnant of former traditions the pleasure house beneath a warlike appearance.

Let us return to the Louvre, no longer to the Louvre of Philip August, but the Louvre as left by Charles V, i.e., the fortress transformed into a palace, combining the needs of a royal habitation with external defense.

Here (20) is the plan of the ground story of the castle of the Louvre repaired and rebuilt in great part under Charles V.[1] Philip August had built the castle of the Louvre outside the walls of Paris to defend the banks of the Seine below against enemies coming from the lower Seine, and also to keep the city under his authority, while retaining his freedom of action. It was like a detached fort protecting the city, and at need defending itself against its inhabitants. Our plan, or rather that of count de Clarac drawn from the most accurate data, that can be obtained today, shows in S H L I parts of the wall of Paris erected by Philip August. The general shape of this plan, which agrees with the description by William de Lorris, shows that Charles V retained the towers, gates and keep of the 13 th century. If the description of Williag de Lorris did not exist, the form, dimensions and spacing of the towers, and the arrangement of the gates would correspond much better to the defensive system adopted at the beginniug of the 13 th than that of the 14 th centuries. The painting formerly preserved in the abbey of S. Germain-des-Pres, and that detas from the beginning of the 15 th century, representing the Louvre and the abbey, the engravings of Israel Sylvestre, do not indicate for the towers the defensive arrangements common from the time of Charles V, but much rather

the sight in his company. Everything is good for those who a are bored, and that monotonous life in the castle, when not occupied by war or hunting, takes up the smallest accidents to find in them a distraction. The pilgrim that knocks at t the gate and claims hospitality for the night, the monk that comes to beg for his monastery, the poet that retails his verses, alone brought rumors and news from outside within these silent walls. That explains the success of these lays, heroic poems, ballads and legends, which abounded in that epoch and occupied the long leisure hours of a nobleman, his family and his men.

If the lord were rich, he sought to embellish his feudal d domain, caused a chapel to be erected, decorated it by paintings and stained glass; he furnished his apartments with hangings, costly furniture and beautiful arms, hence that unbridled taste for luxury, that from the 13 th century finds its place among men still rude, that excitement of the imagination, love for the marvelous, for poetry, music, play and dangerous adventures. While the people of the cities daily participated more in the political life of the country, became industrious and consequently rich, was entirely occupied by positive existence and thus took a larger place, the lord was i isolated in his castle and fed his imagination on chimeras, restrained with difficulty his turbulent instincts, entertained ambitious projects more and more difficult to realize , between the royalty that became stronger and more extended and the nation that commenced to feel and know itself.

From the epoch of S. Louis, French feudalism was no more t than a heterogeneous body in the State, that could further o only decrease. From the military point of view, the wars of the 14 th century restored to it a certain importance, forced it to reenter public life (under unfortunate auspices, it is true), and thus prolonged its existence; the nobility repaired its castles, adopted new means of defense appropriate to the time, thus made an advance in the art of fortification, artillery became a powerful means of attack, so that it was compelled to resign itself to only play a part secondary to royalty, and to regard its castles only as old arms preserved in memory of services rendered, without hope of using them to defend itself. From Charles VI to Louis XI, the barons seemed to be

Michil, p. 40. 1837; (Old French poem).

Note 1.p.131. The defense of the gate is always considered, that it must be very strong.

Note 2.p.131. Drawbridges were quite rare in the 13 th century; at least they did not yet belong to the works of the g gates themselves, but were placed before them, at the beginning or middle of the bridge, and were composed of a great movable platform resting on two piers or posts, pivoted on an axis and raised by means of two suspension chains. (Arts. Architecture Militaire, Pont).

Note 3. p.131. A road led to the entrance, which was very narrow. Two men in front could not pass.

Note 4.p.131. A distinction is made between baileys and lists, the former, as we have seen at the castle of Arques, being an external enclosure, a lower court; the lists were spaces left between two nearly parallel enclosures, between the walls of the castle and the external palisades.

Note 1.p.132. When the site of a castle was selected at the top of a precipice, the rock serving it as base was frequently cut so as to make the precipice more formidable; often ditches were even cut in the rock, as at Castle Gaillard, Roche-Guyon, and there was reserved an external defense cut in the rock. These works are common around castles located on tufa, chalk or soft limestone.

Note 2.p.132. There were numerous lodgings.

Note 3.p.132. B.rracks were still arranged around the keep.

Note 4.p.132. The palace is the dwelling of the lord, distinct from the lodgings, that appear intended as barracks for the garrison.

Note 5.p.132. This is the great hall, that indispensable d dependance of every castle.

Note 6.p.132. In the halls were suspended arms, shields and horns; this was the principal decoration of interiors; in a great number of castles, is still seen the places of the shelves and iron brackets serving to support arms and equipment for war and the chase.

The windows of apartments looked out on the ditch surrounding the castle; the lord when bored (the poet tends to believe this and so do we) looked out on the water, then the sways; he cast to them bread anf wheat, and called his men to enjoy

Note 1.p.129. He caused a drawbridge to be built.(Art. Pont).

Note 2.p.129. It is again a question of fixed machines placed on the galleries of the twers.

Note 3. p.129 He had a watch house built on each tower to watch the outside.

Note 4.p.129. He had projecting galleries built outside the walls. (Art. Hourd).

Note 5.p.129. Advanced works of wood to defend the exterior.

Note 6.p.129. In time of war, outside of castles were built great barbicans of wood, garrisoned by men at arms called by the lord. He did not like to introduce into the enclosure itself the castle mercenaries, men owing him temporary service, and whose fidelity could not be perfectly ensured.

Note 7.p.129. This last trait depicts the customs of the f feudal lord. No one outside kneu his intentions.

Besides the expenses caused to the feudal lords by the construction of castles and the maintenance of a sufficient garrison in a forecast of attack, it was necessary for them to execute considerable works, if they desired to be in condition to resist a regular siege, to provide a quantity of provisions and munitions. The defensive galleries of wood with which were equipped the tops of towers and curtains in the 12 th and 13 th centuries, required the transportation, framing and placing of a considerable amount of carpentry,consequently an enormous number of workmen. These temporary works deteriorated rapidly in peace; it was no small affair to posses and to maintain a castle in that epoch.

In another poem, contemporaneous with the last (beginning of the 13 th century), we again find interesting details, not only on the defenses of the castles, but on the lodgings, dependances, arms and the pastimes of the lords. We request permission from our readers to cite again this passage; (Old French poem).

Note 1.p.130. Extraite de Dolopathos de Herbers,p. 282.

Note 2.p.130. Nearly all castles have only one entrance, as we have already stated above concerning the Louvre. In the Ro Romans de Parise la Duchesse, we find these verses; (Old French poem).

And in the second branch of the Roman d'Auberi le Bourguignon (see Chanson de Roland, 12 th century, pub. by Francisque

postern was easy, since it was narrow and generally closed, could be entrusted to the constable, whose functions consisted in overseeing all the posts, in giving general orders, a and in having brought to him each evening the keys of the different gates.

Note 3.p.127. This is an epigram addressed to the Normans.

Note 4.p.127. On the side of the Tuileries.

Note 5.p.127. To lie, spread bad rumors.

Note 6.p.127. Each chief of a post then watched in turn.

This is a royal castle; the necessity for a lord to place a post or little garrison chiefly in each gate, caused the exits not to be multiplied, the more since attacks were always attempted at those points. This passage of the Roman de la Rose shows that in large castles the number of defenses required relatively numerous garrisons. Now these garrisons ruined the lords; if they were reduced, the defensive system adopted at the beginning of the 13 th century, excellent when properly equipped with men, was bad when all points could not be well equipped and overseen. Then those turns and stops in the communications on the contrary became passable to the besiegers. We shall see in the 14 th century how the lords having recognized these defects sought to remedy them, and to defend themselves well by garrisons, that the state of their fortunes no longer permitted them to keep very numerous.

Now examine descriptions of works executed in the castles of feudal lords, that date from the same epoch (beginning of the 13 th century). (Old French poem).

Note 1.p.128. The garrison of the keep, composed of the most faithful and in great number.

Note 2.p.128. Roman du Renart. Verse 18463 et seq.

Note 3.p.128. Renart flees and takes refuge in his castle, which he has repaired.

Note 4.p.128. It was rare for one to enter mounted into the castle itself, the stables being generally built in the lower court contained in the first enclosure; horses were generally left before the bridge of the castle.

Note 5.p.128. Renart engages workmen to finish their work promptly.

He calls the soldiers, men on foot and mounted to defend t the castle, they come in great numbers at his call.

find in this passage of the description of the Louvre the confirmation of what was just stated concerning the arrangement of curtains and towers. Towers being isolated works connected only by curtains, that they commanded, the rounds were difficult or could be made only in one story; communications between these separate posts were slow; this was a result of the defensive system of that epoch, based on continual mistrust. Thus to a general attack were opened; 1, the low curtains behind which were machines casting projectiles over the ramparts; 2, the battlements of these curtains filled by archers and c crossbow men; 3, the towers that commanded the country afar and the curtains, if they were taken by scaling. To guard against surprise by night, to prevent a partial treason from causing the entirety of the defenses to fall into the hands of the enemy, each evening the posts were shut into their separate towers, and they were not allowed to communicate together. Watchmen placed on the upper battlements of the towers by the posts sheltered there, sentinels placed in the galleries by the constable and not dependent on the posts enclosed in the towers, exercised twofold and controlled oversight. These are not conjectures based on a single text and that of a poet; S Sauval, who could consult a great number of documents now lost, among others the registers of the royal works in the chamber of accounts, and who gives details of great interest relating to the Louvre says; (Book VII, p.14); "a good post had each its captain or keeper, more or less qualified as the tower was large or detached from the Louvre. The count of Nevers was named in 1411 keeper of that of Windal, on Sept. 20 th; under Charles VI, the captains of that of Bois, L'Ecluse and Grosse were dismissed several times. "The command of a tower was then not a temporary function, but a fixed post given by the lord.

Note 1.p.127. On the side of the Seine.

Note 2.p.127. On the side of Rue du Coq. Fear from the charge of the grand constable; the gate entrusted to him always remained shut. It seems that from the time of William de Lorris, that the north gate remained most frequently closed, because of the north wind. This gate was further nothing but a postern pierced in the base of a great tower, probably serving as a lodging for the constable of the Louvre. Guard of this

by each soldier at the moment of defense.

Note 2.p.12ь. Outside the south (principal) gate opening on the Seine, a primary and auite low defense flanked by towers was built about 50 yards before the entrance of the Louvre, t this first defense was double with a gate in each end. It was like a little camp surrounded by walls forming before the south facade of the Louvre what was then called lists. These w works had great importance, for they left to the garrison of a castle all its freedom of action, if it held them; it aided sorties and filled the place of barbicans for great strong p places.(Art. Lice). As William de Lorris says, these low works placed outside the moats, prevented the hostile troop from c coming at the first onset to the edge of the moat without meeting resistance. In an epoch when casting machines did not have a very long reach, it was very important to surround the castle with very considerable outworks; for otherwise at night or by surprise a troop could fill the ditch in a few moments and scale the walls. This fact frequently appears in the history of our wars in France, when it concerns castles of small value, or that had not a garrison sufficient to man the outworks.

Note 1.p.126. On the side of S. Germain l'Auxerrois.

Note 2.p.126. This passage is very singular; it gives us an idea of the arrangement of posts in castles. Each gate formed a defense, that could be isolated from the rest of the fortress, an actual little castle equipped with its terraces, halls, kitchen, oven, well, cellar and even mill; the lord entrusted the guard to a captain with a certain number of men at arms under his orders. It was the same for the guard of towers of some importance. These posts were commonly not relieved as in our days; the garrison of a castle was then only the combination of several little garrisons, just as the entirety of the defenses was only a combination of little forts, at need able to defend themselves separately. The consequences of feudal subdivision thus made themselves felt even in the enclosures of the castle. Hence those frequent treasons on the one hand, or those desperate defenses on the other, of posts that still resisted when all other works of a fortress had fallen. Hence also the importance of keeps, that could protect the lord against those little separate garrisons around him. We still

of an enclosure flanked by towers with a keep at the centre. The lord inhabited the keep and the garrison the towers. One understands how at that time one could see above the battlements of the curtains the upper parts of stone-throwers and m mangonels placed on the area of the court. It was not possible to think of placing these engines on the galleries of the curtains, still less on the towers. William de Lorris says indeed "within the castle," i.e., within the walls, and the descriptions of William de Lorris are always precise. If buildings had been built against the curtains, they would have been covered by roofs, and the tops of the engines could not have been seen over the battlements. This passage of the poem explains a fact that was always strange, when one examines the fortifications of the first half of the 13 th century, particularly those of castles. Nearly all the feudal fortresses of that e epoch, that were not modified in the 14 th and 15 th centuries, present a series of very high towers and relatively low curtains; this indeed is because then the towers being posts or little forts protecting an enclosure, that had not sufficient height to protect great castiug machines, but not enough to prevent the machines from castirg stones over the battlements on the assailants. When Simon de Montfort besieged Toulouse, he took the external castle, that wrongly or rightly passed for a Roman work, but whose walls were very high. Pressed by time, rather than lower the walls between the towers to permit establishing the great engines, he caused terraces to be built inside. Thus the defensive system of castles before the second half of the 13 th century consists of towers of considerable command, connected by low curtains, free inside to permit placing on the ground powerful casting machines. This explains why in most of these castles may be seen no trace of habitations abutting against these curtains. At castle gaillard of Andelys, only two barracks are attached to the c curtains, one in the outer court and the other in the inner court; but these barracks are erected on the side next the p precipice, that did not allow the besieger to establish himself opposite the ramparts. We shall soon see how and why this system was entirely modified in the 1. th century.

Note 1.p.12.. The upper galleries of the keep were equipped with fixed casting machines, besides the portable arms borne

assemblage of people. We see that arrangement of four gates retained in the 14 th century at Vincennes and at the castle of the Bastile, that however was only comparatively unimportant in extent. The four gates were especially required, we b believe, by the necessity for erecting these fortresses placed around the city of Paris to maintain respect among the people. It was unnecessary here to shut up and defend himself like a lord in the midst of his domain, but again in a pressing case to send a part of the garrison to a part of the city in revolt, and conseauently to not allow himself to be blockaded by a b body of insurgents, who were barricaded before the single gate. Long afterwards Henry III thought it well to have several gates to his Louvre.

Note 1.p.124. It is evident that this refers to portcullises.

Note 2.p.124. The masters of the work erected a tower with great skill in the middle of the enclosure, it is here a question of the keep of the Louvre, that contrary to the customs of the 12 th and 13 th centuries was exactly at the middle of the square enclosure. But let us not forget, that the keep of the Louvre was an exceptional tower, a treasury as much as a defense. Besides, the four gates perfectly explain the location of this keep, that masked and was on the axes of all four.

Note 3.p.124. Here is still exaggeration by William de Lorris; the keep of the Louvre was only about 66 ft. diameter by 98 ft. high; the keep of Coucy is of very different importance, its diameter being 101.7 ft. and its height about 213 ft.; yet the keep of Coucy must have been erected when our poet wrote his romance. It is certain that this keep was only built after that of Philip August. The proud lord of Coucy causing the w walls of his castle to be erected in haste in the hop of placing the crown of France on his head, did he wish to do more and better than the sovereign he claimed to succeed?

Note 4.p.124. Did men believe in the time of William de Lorris, that lime slaked with vinegar made better mortar? Was th that method still employed?

Note 5.p.124. This passage merits the most serious attention; it no longer here concerns the keep but the entirety of the c castle. The curtains of the Louvre of Philip August were not doubled by internal buildings, and the castle of the Louvre, like the castles of the 11 th and 12 th centuries was composed

combination of buildings placed in regular order, subjecting the defense to the arrangements required by the habitation, the real castle constructed according to a general scheme, an arrangement entirely returning to the domain of architecture.

Today all these feudal residences are so ruinous, that one can scarcely obtain an exact idea of the parts serving for t the habitation, the towers and curtains are thicker than the remaining structures, and could resist destruction, leaving us to judge of the permanent defensive arrangements, without giving us the detail of the internal distribution, or of the numerous external dependances, that protected the body of the place. In order to consider what a castle must have been during the first half of the 13 th century, it is necessary for us to have recourse to descriptions contained in chronicles and romances; fortunately these descriptions are not wanting and they are often quite detailed. One of the most ancient, complete and singular is that contained in the first part of the Romance of the Rose, and which under the name of the castle of Jealousy, depicts the Louvre of Philip August. None is ignorant that the great tower or keep of the Louvre was built by that prince to receive his treasure and at need to serve as a prison for the State; all fiefs of France were held from the tower of the Louvre, in which the great vassals rendered homage, and took the oath of fidelity to the king. The other structures of that castle were likewise erected by Philip August. But allow William de Lorris [1] to speak. (Old French Poem. p. 122, 123.[1]

Note 1.p.122. Roman de la Rose, verse 3814.

Note 1.p.123. William de Lorris here doubles the dimensions in length and breadth; but it is necessary to allow poets to exaggerate.

Note 2.p.123. Indeed before the principal gate and toward the Seine was a little advanced work adapted to contain a guard.

Note 3.p.123. These four gates were an exception; generally castles in that epoch possessed only one or at most two gates with some posterns. But the Louvre was a castle in the plain near a great city, and the number of gates was caused by the external defenses, that were very important, and by the necessity for the sovereign to receive in his castle a great assem-

Note 1.p.121. Inst. de S. Louis, by count Beugnot.

Note 2.p.121. Les Olim (ordinances). Vol. 1. p. 411.

Note 3.p.121. The same. Note 35.

At the end of the 13 th century feudalism, ruined by the c crusades, attacked in its organization by the royal power, w was no longer in condition to cause serious fears to the monarchy, nor sufficiently rich and independent to erect fortresses like that of Coucy. Besides in that epoch no lord could construct nor even enlarge or fortify anew a castle, without having first obtained permission from his sovereign. We find in the Olim among other decrees and ordinances on this matter, that the bishop of Nevers brought au action against the prior of Charite-sur-Loire, because he wished to erect a fortress, and had himself been actioned by the bailiff of the king for having simply repaired the battlements of his own. S. Louis had assumed the right of granting or refusing the construction of fortresses; and if he could not overthrow all that existed in his time on the area of his domains, and that gave umbrage to him, at least he claimed to prevent the erection of new ones; and indeed one finds few castles of importance built from 1240 to 1340, i.e., during that period of the French monarchy, that proceeds resolutely toward unity of power and of government.

From the middle of the 14 th century on the contrary, we see the old castles repaired or rebuilt, new fortresses erected on French territory, under cover of the troubles and disasters that desolated the country; but then the feudal spirit was modified, as well as the customs of the nobility, and these residences take forms different from those chosen during the reign of Philip August and at the beginning of that of S. Louis; they became fortified palaces, while up to the 13 th century castles were merely fortresses provided with habita. tions. These very different characteristics are very easily seen; they have great importance from the architectural point of view, and the castle of Coucy as it must have existed before the reconstruction at the end of the 14 th century, serves as a transition between the castles of the first and second kinds; it is no longer an enclosure containing scattered habitations, like a fortified village dominated by a princely fort, the keep; and it cannot either be the palace, the comb-

so that I would never recover therefrom." Certainly there is every reason to believe that Joinville was a good nobleman, and that he spoke truth; but how many others in taking the cross and leaving their subjects to be governed by officers of the king, permitted them thus to pass from an insupportable rule under a less harassing government because less local and higher? The feudal lords possessed judicial authority over t their acts; the royal bailiffs were charged by Philip August to receive each month at the assizes the complaints of the k king's subjects, to name among the provosts a certain number of men without whom no matter concerning the cities could be decided, to supervise the magistrates, and these in the hands of S. Louis were a powerful arm directed against the feudal prerogatives. That prince caused to be instructed in the Roman law those, that he destined for the functions of bailiffs; he extended their powers outside the tribunals by charging them with the higher administration, and soon these men devoted to the royal cause openly attacked the judicial authority of the barons by creating the royal cause, i.e., they enforced the principle of the king, as chief of the feudal government, over all others had the right of judging certain cases, therefore termed royal causes. Rigorously that opinion could be sustained; but it was necessary to distinguish clearly the royal cases, with the danger of seeing the king become the arbiter in all disputes; now this was never desired by the bailiffs; petitions, entreaties, threats, nothing could decide them for it; every time that they heard discussed in the feudal courts, t that seemed to affect the authority of the king, they intervened between the parties, declared the cause a royal one, and took the decision into their courts.[1] The encroachments of t the bailiffs on the feudal jurisdictions were supported by t the parliament, which in certain cases enjoined the bailiff to enter on the lands of the feudal lords, and to seize there such prisoners, although these lords were high justiciaries, and according to law could bear arms to punish on their lands and fiefs."[2] By feudal law the king could summon to his court the vassal, who had refused to deliver to him a prisoner, regard his refusal as a felonious act, pronounce against him the penalties fixed by custom, but could not send his bailiffs to serve writs in a lordship, that did not belong to him.[3]

of S. Louis, the nobles no longer believed they would be exposed to them, and consequently had neither arms nor horses, nor war equipment; it was necessary to borrow; they mortgaged their fiefs to the king, who was rich and could lend. At the end of the crusade, those of the lords surviving their companions in arms returned so poor and miserable, that they were in no condition to redeem their fiefs, which then became definitely the property of those, who had received them as security. This species of political usury seemed natural in the time that it occurred; the encroachments of S. Louis were concealed by the legality of his purposes; no one would have dared to suspect him of an unjust matter. By the power of his virtues, he appeared to consecrate even the vast results of his politics.[1]

Note 1.p.120. Instit. de Saint Louis, by count Beugnot.

S. Louis by means of these expeditions oversea, not only r ruined feudalism and deprived it of its castles, but also centralized under his command a numerous army, that on his return and in spite of his misfortunes, he knew how to use for e extending the royal domain under a religious pretext. Just as under the pretext of protecting himself from the menaces of the Old Man of the Mountain, he established a special guard about his person, which Tday and night took care diligently to guard his body,"[2] but which in fact was far more intended to prevent treachery of the nobles.

Note 2.p.120. William de Nangis.

Joinville relates that in leaving for the crusade and to p prepare himself, he mortgaged to his friends a great part of his domain,"so that there remained to him not more than 1200 livres of rent for land." Arrived in Cyprus, there was left to him in cash not over 200 livres tournois ($42) in gold and silver, when he had paid his passage and those of his knights. S. Louis learning this, sent for him and gave him 800 livres tournois ($168) to continue in the expedition. At the moment of setting out for the second crusade,"the king of France and the king of Navarre strongly pressed me to take the cross, a and to undertake the pilgramage of the cross. But I replied to them, that while I was beyond the sea or in the service of God, the men and officers of the king of France had wronged and oppressed my subjects, so much that I was impoverished;

after having delivered Saintonge from the hands of the king of England and of the count of Marche, finally after having given peace to his kingdom with as much good fortune as courage, and having substituted actual for nominal sovereignty. In a similar occurrence, peace, quiet, reform and order could originate the most serious dangers in the midst of an unquiet and idle nobility, that already felt the hand of the sovereign encroaching on its privileges.

Further in the history of nations, there is a moral tendency, to which perhaps historians do not attach enough importance, because they cannot enter into the private life of individuals, this is weariness. When war ended and order was restored and consequently the sway of the government, what could these feudal lords do, shut up in their castles and surrounded by their companions and men at arms? If they spent the days in the chase and the evenings in enjoyments, if they entertained around them pleasant companions to kill the time, then they soon saw their resources expended, for t ey no longer h had the possible resources brought to them by the troubles a and disorders of a state of war. Ef more prudently they reduced their train, discharged their soldiers, and resigned themselves to live as peaceful proprietors,,their fortresses became an insupportable residence, time for them must be of a l length and a hopeless monotony; for if some nobles in the 13 th century possesses a certain culture and devoted themselves to the pleasures of the mind, the great majority conceived no other occupations, than those of war and future expeditions. Weariness then produced the most extravagant projects in those heads accustomed to the noisy life, to the emotions of war.

S. Louis had not yielded to the armed and menacing nobles, after having compelled them to sheathe their swords, but perhaps did not believe himself in condition to contest the weariness and idleness of his vassals, to pursue the reforms meditated, among the jealous fortresses by which the soil was c covered.

"The crusades devoured a great number of nobles, and restored to the throne their vacant fiefs. But under no reign did they contribute more to the increase of the royal domain, than under that of S. Louis, it is easy to find the reason; the c crusades had already become slightly out of date in the time

age, he understood that peace was for royalty a solvent for ambitious feudalism, accustomed to arms, always discontented when it no longer had the hope for extension; the reforms meditated by him were not yet suffifienctly rooted in the midst of the people to oppose an obstacle to the turbulent spirit of the lords. It was necessary to oust from their nests those dangerous neighbors that surrounded the throne, to wear out their power, to impair their wealth, to secure this result, had then the king of France any means other than the crusades? We can scarcely believe, that a prince with such a mind, direct, just and enlightened, as that of S. Louis, when he undertook his first expedition to the East, had in view merely a personal aim. He could not be ignorant, that in abandoning his domains to reconquer the holy land, in a time when the spirit of the crusades was no less than popular, he was leaving in suspense the great reforms, that he had undertaken, and that before God he was responsible for the evils, that his voluntary absence might cause among his people. The kingdom at peace, the members of the feudality began to struggle with each other; this was permanent civil war, a return to barbarism; to desire to oppose by force the pretensions of the great vassals was to provoke new coalitions against the crown. To carry these powerful rivals far from France was for the monarchy in the 13 th century the sole means of thoroughly impairing feudalism, and for reducing those impregnable fortresses seated just on the steps of the throne. Had S. Louis been surrounded only by vassals of the temper of lord de Joinville, it is doubtful that he would have undertaken his crusades; but the moral ascendant that he had acquired, his attempts in monarchical government perhaps could not have broken the feudal alliance, if he had not occupied and at the same time ruined the nobility by these distant expeditions. S. Louis had for himself the experience acquired by his predecessors, and each crusade, whatever its result, had been during the 11 th and 12 th centuries a cause of the decline of feudalism, a means for the sovereign to extend the monarchical power. What time did S. Louis choose for his expedition? It was after having vanquished the armed coalition, at the head of which was found the count of Brittany, after having protected the lands of the count of Champagne from the lords leagued against him,

but which received according to merit a more or less considerable portion of land under the title of fief; once possers of that fraction of the lord's domain, they built their manor h houses, i.e., fortified houses without keep or towers, and t thus lived as proprietors of the soil, having only some duties toward the lord, lending him their aid and that of their men in case of war, and rendering homage to him. By prolonging a state of war, each feudal lord then had the hope of increasing his domain at the expense of his neighbors, of augmenting the fiefs pertaining to the castle, and of surrounding himself with a great number of vassals disposed to support him.

Note 2.p.114. This view of the enterior of the court of the castle of Coucy is assumed to be taken from the side of the chapel nearest the entrance. On the right is seen the keep w with its postern and drawbridge; in the third plane is the principal gate and the circular wall; in the first plane is the chapel and the beginning of the stairs ascending to the covered gallery of the circular curtain.

By his conquests, Philip August could largely satisfy that hierarchy of ambitious men, and although he lost no occasion presented for uniting the fiefs to the royal domain, for dividing them and for diminishing the political importance of t the great vassals, by making the fiefs directly dependent on the crown, yet in dying he left a good number of lords, whose power could give umbrage to a sovereign having less strength and less activity to display. If Philip August had lived ten years longer, and could have governed his provinces in entire peace, it is difficult to know what he could have done to occupy the ambition of the great vassals of the crown, and how he could have undertaken to suppress that power, which could believe itself now a rival of the increasing royalty. The short reign of Louis VIII was again filled by wars; but during the minority of Louis IX a coalition of the great vassals came near destroying the work of Philip August. Fortunate circumstances, a division of the allies, the ability of the mother of the king, saved the crown; contests ceased and the royal power appeared to be strengthened anew.

One side of the character of S. Louis, that one cannot admire too much, is the perfect knowledge of the time and of the men among whom he lived; with a mind much in advance of his

this enormous keep, surrounded by high structures of severe appearance, must seem contracted and dark, as may be judged by the view given.(19).[2] All was colossal in this fortress; although executed with great care,the construction has something rude and savage, that belittles the men of our time. It seems that the inhabitants of this feudal residence must belong to a race of giants, for everything for customary use is at a scale superior to that admitted today. The steps of the stairs (we are speaking of the structures of the 13 th century), the sills of the openings in the battlements, and the benches are made for men above the ordinary height. Did Enguerrand III, a fowerful lord with fierce manners, an intrepid warrior, desire to impress by this appearance of more than human strength, or did he form the garrison of selected men? We cannot decide this. But in erecting his castle, he certainly thought of manning it with giants. This lord always had fifty knights with him, which gives a number of at least five hundred men at arms in ordinary times. Not less numerous a garrison was required to guard the castle and the lower court. The cellars and vast storehouses, that still exist beneath the ground stories of the buildings of the castle allowed the storage of provisions for more than a year, assuming a garrison of a thousand men. In the 13 th century a feudal lord possessing a similar fortress and with wealth sufficient to surround himself with such a number of men at arms, and to supply them with munitions a and provisions during a siege of a year, could defy all the armies of his time. Now the lord of Coucy was not the only vassal of the king of France, whose power was to be feared. The rude labors of the reign of Philip August not only gave vivid splendor to the crown of Franci, but gave him the advantage of occupying without interruption his nobolity, to whom war was life. Always kept on the alert by the activity and ambition of Philip August, who had to conquer rich provinces, to struggle against enemies as powerful as himself, but less obstinate and less skilful, feudalism lost its leisure and in assisting that great prince, found a means of enriching and increasing its domains, in lending him the support of its arms, it augmented the royal power, but it had no reason to regret its services. It must be recalled that most feudal lords were surrounded by a certain number of knights, who were not paid,

are opened in the halls, that are further accompanied by privies.(Art. Prives). One will note that the winding stairs do not ascend from the bottom, but are interrupted above the second story, to take the other side of the entrance to the tower. This is a common arrangement in towers of that epoch,to avoid treason and to compel persons desiring to ascend to the parapet to pass through one of the halls. This was a means for making supervision easy and for recognizing the men of the g garrison, who ascended to the parapet for service; for the p parapets of the curtains being only accessible from the towers, the stairs of the towers consequently served all the upper defenses. We have represented at G (Fig. 17) the movable bridge placing the great hall in communication with the covered way of the lower court at the south side. If by scaling the enemy had obtained possession of the covered way H of the outer circular curtain, it was necessary for him to force the door I or the gate K to penetrate into the castle. The posts established at A or L threw him over the parapet or into the ditch behind the wall. The post A served the terrace M with battlements above the gate, just as the post L served the covered gallery N commanding the movable bridge G. As for the keep, in the second story it opened to the covered gallery of the curtain by a movable bridge O, but passing through the guard-room L. With defenses so well designed, no surprise was to be feared, however little the garrison of the castle was fully acquainted with the numerous turns, the resouces offered by these, and that they should guard with some care. A birdseye view (18),taken from the side of the lower court, will make clear the internal and external arrangements of the castle of Coucy.[1]

Note 1.p.114. This view is made by means of the existing r ruins and the view given by Du Cerceau in his "Plus excellent Bastiments de France." We have represented a portion of the defensive galleries in place at the tops of the keep and of t the right tower.

It must be recognized that a long stay in a castle of this importance must be very dreary, particularly before the modifications made in the 14 th century, changes evidently caused with the intention of rendering the occupation of this residence less shut in and more convenient. The court, shadowed by

at B being the keep with its enclosing wall. One will find in Art. Donjon the description of this magnificent structure. At R is the chapel, orientated and broadly conceived, executed with unequaled grandeur, if we judge by the fragments of mullions of the windows scattered on the ground; at D is the great hall of the tribunal, called that of the knights, because one sees in the niches the statues of the nine knights. Two fireplaces warm the hall, strongly lighted at its southern end by a great glass window opened in the gable. Wooden carpeentry with a painted vault of boards covered the hall. At E is the hall of the nine Prussians (?), whose figures were sculptured in the round on the mantle of the fireplace. A boudoir F is taken from the thickness of the curtain and accompanies this hall; that room is lighted by a large and wide window looking out on the country toward Noyon, and was certainly the most pleasant part of the castle; it was warmed by a little fireplace and elegantly covered by a small cross vault.

The last structures date from the end of the 14 th century; one sees perfectly how they were added to the older buildings; how to render them more habitable, the curtains were raised a story higher; for in the primitive construction, these certainly did not reach a high level, leaving to the five towers a greater domination, and the buildings for habitation had a much less importance. From the time of Enguerrand III, the actual habitation of the lord was the keep; but when the feudal customs, however rude they were, became in the country elegant and refined about the end of the 14 th century, this keep must appear very gloomy, dark and inconvenient, the lords of Coucy then built those elegant structures opening on the country, fortifying them according to the method of that epoch. The keep and its curtain, the four angle towers, the lower part of the curtains, the substructure of the great hall, the ground of the entrance and the chapel, as well as the enclosure of the lower court, belong to the primitive construction of the castle of Coucy under Enguerrand III.

These four towers merit a few words. Each champer above the ground story is internally composed of six sides with recesses, some of which are pierced by embrasures. These rooms are vaulted and the niches alternate in each story, the solids b being over the voids and vice versa.(Art. Tour). Fireplaces a

Coucy still stands, and has remained one of the most imposing marvels of the feudal epoch.[1] If to time alone had been left the task of destroying the feudal residence of the lords of Coucy, we should still see today these enormous structures in all their primitive splendor, for the materials of excellent quality have suffered no change; the buildings were conceived in a manner to endure eternally, and the internal paintings in sheltered places are as fresh as if they had just been executed.[1]

Note 1.p.111. A short time since, the Minister of State and of the House of the Emperor (Napoleon III) gave orders, that these remains should be preserved, and excavations should be undertaken. These works were commenced under the supervision of the Commission of Historical Monuments, and will save from total ruin the castle of Coucy, and permit the recovery of t the old arrangements of great interest for the art of fortification of the middle ages.

Note 1.p.112. The paintings in great number still found in the interiors of the towers of the castle of Coucy are of great interest, and we shall have occasion to speak of them in Art. Peinture.

So far as one can recognize in the catual condition, the o castle of Coucy has foundations intersected by numerous large subterranean passages, that seem to have been systematically arranged to establish concealed communications between all parts of the internal defense and the exterior. Tradition even goes so far as to state that one of these subterranean passages, whose entrance is seen in the great cellars under the residence buildings M, extends through the hills and valleys to the abbey of Premontre. We are far from guaranteeing the fact, since similar legends are attached to the ruins of all castles of the middle ages in France; but it is certain that on all sides in the courts are perceived the openings of vaulted galleries, that are now filled with rubbish.[2]

Note 2.p.112. We hopesoon to discover and to clear the whole of the subterranean passages of Coucy, and to be able to say the last word on this little known part of fortification in the 13 th century.

We give (17) the plan of the second story of the castle of Coucy. At A are seen the barracks placed near the entrance,

of the external ditch he succeeded in mining the foot of the outer circular wall, he found the subterranean gallery occupied; this sap could nowise weaken this wall, for one will note that this subterranean gallery is within a slope, a substructure, behind which the masonry of the wall remains intact.

Note 3.p.108. This could also be defended, but much more f feebly, agains the lower court, in case that were taken before the city.

Of all the defenses of the castle of Courcy, the keep is m much the strongest and best treated. That fine structure merits special study, that we shall elucidate in Art. Donjon.

The towers and keeps of the castle of Coucy are furnished in their upper parts with projecting stone corbels intended to receive the wooden defensive galleries.(Art. Hourd). At t the end of the 14 th century, the great hall and the residence buildings M were rebuilt, as well as the upper stories of the gate; larger openings were pierced in the exterior, and the curtains received machicolations with parapets of stone according to the system of that time, anstead of the consoles with defensive galleries of wood. The other parts of the castle r remained as Enguerrand III had left them.

It was only during the commotions of the Fronde, that this magnificent nobleman's residence was entirel ravaged. Its governor, Hebert by name, was summoned by cardinal Mazarin to s surrender the place to marshal d'Estree, governor of Laon. Hebert having resisted that demand on the pretext of contrary orders left him by king Louis XIII, siege was laid to the city on May 10, 1652, which was soon taken; then some time afterward the garrison of the castle saw itself compelled to capitulate. Cardinal Mazarin immediately caused the fortifications to be dismantled. Metezau, son of the engineer that constructed the dike of Rochelle, was the man that the cardinal sent to Coucy to complete the work of destruction. By means of mines, he blew up the front portion of the wall outside the keep and most of the other towers, burned the buildings of the castle and made it uninhabitable. Since then the inhabitants of Coucy until recently did not cease taking from the enclosure of the castle the stones, that they needed for building their houses, and this long destruction completed the work of Mazarin. Yet in spite of these causes of ruin, the mass of the castle of

court to the covered way at the top of the outer wall by the stairs V near the entrance of the keep. Communication from the halls P was by means of a stairs to the bottom of the ditch, behind this circular wall, and with the exterior by a postern pierced at X and furnished with folding leaves, machicolations and portcullis, corresponding to a second postern Y with drawbridge opening on the slope and masked by the tower. G. A lower passage X' was covered by a half tunnel vault and pierced at the level of the bottom of the ditch, following t the circumference of the curtain, and was evidently designed to stop the work of miners, like our galleries of permanent countermines arranged under the fronts of curtains and bastions. In this subterranean gallery at X″ was found an excellent spring at the level of the ground for the use of the kitchen. At W are privies made in the thickness of the wall for the guard of that enclosure and the men in the kitchens. At Z was a hall with a wooden stairs, that could easily be destroyed, which connected the subterranean gallery with the upper covered gallery. The little stairway Q opening into the hall P served the portcullis and machicolations of the postern X. The lower subterranean gallery X′ was itself connected with the stairs U serving the upper works of the gate. If the besieger had taken the postern X (which was difficult, since it was necessary to pass the first gate Y under the projectiles cast from the upper part of the circular outer wall and the battlements opened on the wall J, to force two folding doors and face the machilocations), he found himself facing a portcullis opening to the bottom of the ditch next the outer circular curtain, having at his left the ironed door closing the bottom of the stairway of the kitchen, and stopped in the lower gallery X′ by the spring X″, which is an actual well in a dark cellar. If he forced the portcullis, he penetrated to the bottom of the internal ditch V′, which is paved and without communication with the ground of the court; beaten by the upper defenses of the keep, that cast projectiles on him from a height of 197 ft. and from the covered way on the curtain, he was lost, the more so that the men occupying this covered gallery could descend the stairs Z, pass into the subterranean gallery X′, cross the spring on a plank, and cut off his retreat by retaking the postern behind him. If from the bottom

Enguerrand III. Communication from the city to the lower court was only by a gate opening into the city and defended against it by two small towers.[3] The lower court was protected by the keep B, which dominated its entire perimeter and its ramparts flanked by the two towers C D of the castle. A ditch 65.6 ft. wide separates the castle from the lower court. A single bridge at E thrown over this ditch gave entrance to the castle; it was composed of isolated piers with two wooden drawbridges defended by two advanced gates E', E", and two guardhouses F, F' set on piers so as to leave the bottom of the ditch free. The gate at G had double portcullises and folding leaves. This gate opened into a long vaulted passage, easily defended and that must have had machicolations. At both sides of this corridor were arranged guardrooms H, vaulted and able to contain numerous posts. Above rose a barrack in several stories dominating the gate and joining the curtain I. From the entrance corridor one entered the court K of the castle surrounded by buildings adjoining the curtains. At L were found service buildings, vaulted in the ground story, surmounted by two stories; at M the residence apartments in three stories at the si side of the castle least accessible from outside, and served by the grand stairway M'; at N were vast storerooms, vaulted in the ground story (cellars) with cellars beneath covered by pointed tunnel vaults. The storehouse N supported in the second story the great hall lighted from the exterior. At O is the basement of the chapel, which in the second story found itself on a level with the great hall. The kitchens were very probably placed at P with a special stairway P' communicating with the cellars; they possessed a private court at R, reached by passing beneath the chapel, whose ground story remained open. The towers C, D, S, T possessed two stories of cellars and t three stories of halls above ground, without counting the story of the roofs. As one will note, these project very strongly from the curtains,so as to flank them well. These towers are not less than 59 ft. diameter outside and about 115 ft. height above ground outside, are nothing beside the keep, that is 101.7 ft. outside by 210 ft. from the bottom of the ditch to the crown. Besides its ditch this keep possesses a circular outer enclosure or curtain, that protects it against the exterior next the lower court. One ascended from the ground to the

Gobain, Assis, Marle, Fere, Folembray, etc. His indomitable spirit and indeoendent character were stimulated by immense wealth; for a moment this vassal thought of laying hands on the crown of France; but his serious conspiracy and ambitious projects were baffled by the adroit politico of queen Blanche, who knew how to remove from the feudal coalition one of its most powerful supports, the count of Champagne. Lord de Coucy was soon obliged to take an oath of fidelity between the hands of the king, who did not wish to remember his projects. It is to the epoch of the ambitious projects of Enguerrard III, that it is necessary to refer the construction of the magnificent castle, whose colossal ruins are still to be seen. The castle of Coucy must have been built very rapidly, as well as the e enclosure of the adjacent city from 1225 to 1230. The character of the sculpture and mouldings as well as the construction does not permit it to be assigned to an earlier or a more recent epoch.[1]

Note 1.p.108. It is understood that we do not mention here the restorations undertaken and completed at the end of the 14 th century.

The castle of Coucy is no longer an enclosure flanked by buildings arranged by chance; it is a vast edifice, conceived as a whole and erected at a single effort, under a powerful will and by ceans of vast resources. Its site is admirably chosen, and its defenses are arranged with an art of which the description can give but a feeble idea.[2]

Note 2.p.108. For the site of the castle of Coucy, see Art. Architecture Militaire, Fig. 20.

Built on the end of a plateau of very irregular form, the castle of Coucy dominates the very steep slopes, that rise ab about 164 ft. above a rich valley terminated at the northwest by the city of Noyon and at the north-northeast by that of Chauny; it covers an area of nearly 2.5 acres. Between the city and castle is a vast fortified lower court, whose area o (7.5 acres) is at least thrice that occupied by the castle. This lower court contained halls sufficiently extensive, of which traces remain visible today, enriched by columns and c carved capitals, with cross vaults, stables and an orientated chapel shown at A on our plan of the ground story (16). This chapel was evidently of an epoch preceding the structures of

erecting new structures, such as chambers, chapels, kitchens, that at first were scattered here and there in the area of t the enclosure. When a certain number of these buildings had thus been appropriated or created, they were successively connected by covered passages (aleia) built of wood, sometimes in the form of open porticos, but more frequently closed at the sides. These buildings were thrown into the middle of the enclosure leaving the defenses free, as would be a city or v village enclosed by walls. In the 13 th century the services were more connected to the enclosure itself, which the internal structure aided in strengthening; only then appears the castle with any architectural similarity, the preceding establishments being only defenses more or less strong and extended, enclosing habitations and service buildings of every nature and of very different dimensions with no idea of an entirety. The 13 th century saw magnificent castles erected, that added to their quality of fortress that of magnificent residences abundantly provided with their services and all required for the life of a lord living in the midst of his domain, surrounded by a little court and a garrison.

Note 1.p.106. Some Account of Domestic Architecture in England from the Conquest to the end of the 13 th century.Chap.3.

After S. Louis feudalism waned; it was absorbed by royalty on the one hand, and encroached on by the people on the other; the edifices that it erected naturally felt this political s situation; they arose on the soil where they resumed influence; they are rarer or poorer where the royal power and the national organization became stronger and organized. At the death of Philip August in 1223 feudalism, that had aided that prince in reuniting under the crown the finest provinces of France, found itself rich and powerfu,; after the example of the king some great vassals had acquired a number of fiefs, either by alliances or as the price of their services, or because of the ruin of nobles, who had lost all during the crusades of the 12 th century. During the first years of the minority of S. Louis as all know, there was formed a formidable league against the crown of France, guarded by a woman still young and not suspected of great political qualities. Among the vassals of the crown of France leagued against the infant king, one of the most powerful was Enguerrand III, lord of Coucy, S.

built in a certain order, and that they are fixed lodgings. It appears that in the 13 th century the habits of the lords and of their men were more civilized, and that they demanded arrangements less barbaric than those accepted until then. We see hou little importance fixed lodgings still had in castle Gaillard, a residence of the sovereign erected at the end of the 12 th century. One can scarcely understand how a garrison of several hundred men could live in that small area, almost exclusively occupied by the defenses. The soldiers must sleep at random in the towers and under some sheds attached t to the walls.

In England where written documents abound relating to the old habitations of nobles, one finds proofs of this change m made in the 13 th century. At that epoch the fortified royal palaces receive numerous additions of civil buildings erected with a certain luxury, and the castles of the barons take a m more domestic character; frequently even the keep, as M. Parker states in his Domestic Architectura,[1] was abandoned for a hall and chambers built within the inner enclosure. This caused that change, that in nearly all descriptions of castles built from the time of Henry III and Edward I, the great towers or keeps are represented as being in a dilapidated state and generally without roofs. They had been abandoned as residences because of their inconveniences, although by the strength of their construction they could still be employed in time of war, after some repairs. The orders for restoration for the "royal houses" in various castles are very numerous during the 13 th century. These do not apply to the castles of Edward (Edwardian castles), edifices generally built b by Edward I, in which different apartments intended for various uses were arranged according to a general plan, but indeed to castles of the Norman period, which then assumed the character of a residence by more recent structures. The orders gi - given by Hensy III for repairs and additions to the royal manor houses prove that no systematic plan was adopted, when t these additions are concerned. When a large area of ground w was surrounded by a fortified enclosure, and formed what was called a court (curia), in which the primitive lodging was i insufficient, it became quite common in the 13 th century to enlarge that lodging according to needs by successively erect-

entrance doorway above the ground and their platform. These towers took the German name of Bergfried, Latin Berefridus, in French belfry. The encloaures of these more ancient castles absolutely lack the external flanking. They are surmounted by a series of battlements."

Note 2.p.10. Notes inserted in Bull. monum. Vol.8,p.246 e s.

We shall go farther than M. de Krieg, and shall even say t that the towers employed for flanking the enclosures are but very rarely found in the castles on the banks of the Rhine a and in the Vosges before the 15 th century. The castle of S. Ulrich, the old portion of the castle of Hochkönigsburg, that of Spesburg, although built during the 13 th and 14 th centuries, are entirely without flanking towers.[3] These are structures forming salient angles, of geometrical figures externally rectilinear and grouped around the keep or belfry. Most of these castles were built on inaccessible points and take their entire strength from their site, being but moderately defended. The keep rising above the buildings permits discovery afar of the presence of an enemy, and the garrison being warned could easily prevent the scaling of the steep slopes, bar the paths and stop a numerous army far from the castle, without b even being compelled to retire behind its walls.

Note 3.p.10. Notes sur quelques chateaux de l'Alsace, by M. Al. Rome. Paris. 1855.

Yet analogous locations did not prevent the French lords f from furnishing with towers the flanks and projecting angles of their castles during the 12 th, 13 th and 14 th centuries.

In the construction of castles in the 13 th century occurred a notable change. Until then these residences consisted, as we have seen, only of enclosures more or less extensive, single or double, in the middle of which rose the keep, which served as the residence of the lord and the hall sometimes c comprised in the keep itself. The other buildings were only wooden sheds separated from each other, having rather the appearance of a temporary barrack than of a fixed residence. T The chapel, refectories, kitchens, storehouses and stables w were placed in the interior of the enclosure and were not connected in any manner with the fortifications. We have seen, that in the plan of the castle of Montargis (Fig. 15), already the service buildings are attached to the walls, that they are

disperse quickly to all points of the enclosure by a stairs T with three flights. The connection of that stairs with the great hall could be cut, and the great hall served for retreat if the enclosure were forced. The great hall is one of the characteristics of the French castle, as we stated at the beginning of this Article. In the Norman castles the great hall is situated in the keep, or rather the keep is only the great hall made a principal defense. In the French castle of the 13 th century, the great hall is separated from the keep, being the place for gatering the men at arms of the French lord; t that is a last memorial of the customs of the German chief a and his companions.

The great keep F is in the centre of the court as in the p primitive mediaeval castle (Fig. 1); it is in several stories with a circular court at the centre; it was placed in communication with the great hall in the second story by means of a gallery K, that could also be cut off at its end. This keep commanded the entire enclosure and its buildings; but having no exit to the outside like the Norman keep, it did not offer the same advantages for the defense. The garrison had barracks in the buildings at the side L where the enclosure was most accessible. At O were the stables, bakery and storehouses; at H the chapel, and at N was a post near the entrance D. The little structures surrounding the keep were of a date later than its erection. The postern E gave access to vast gardens, themselves surrounded by an enclosure.[1]

Note 1.p.105. This castle exists no longer, the plan, elevations and details are of great interest, and are given by Du Cerceau in his Maisons royales de France.

In France and Normandy from the Carlovingian epoch, the enclosures of castles were flanked by towers. But on the banks of the Rhine and the adjacent provinces of Germany, it does not appear that this means of defense was usual before the 13 th century, which causes the supposition, that the flanking towers were a Gallo-Roman tradition.

"The feudal monuments from the 10 th century until the crusades," says M. de Krieg,[2] "have their common type on both banks of the Rhine. One finds there the square tower (rarely cylindrical), which is either placed on Roman foundations, or copied religiously after these models with their base, their en-

the said forts. They governed all these nobly and wisely; so much so that at the end of five weeks, the English surrendered, and placed the said castle Gaillard in obedience to the king." It is evident that this siege was only a blockade, and that the English did not have to sustain assaults; the lack of provisions probably decided them to surrender, for they left safely with lives and goods; the garrison was composed of 220 combatants. Even again in that epoch, when cannon were in use, castle Gaillard was a very strong place.

We have occupied ourselves with Norman castles of the 11 th and 12 th centuries in preference to all those erected during this period in the other possessions of France, because these castles have a particular character, differing in many points from the first fortresses of the middle ages, and built during the same time on French soil, and especially because they appear to us to have made a considerable advance in the art of fortification.

In the 13 th century French castles seem to have profited by the arrangements of details made by the Normans in their castles, but still retaining something of the Merovingian and Carlovingian traditions. We find a remarkable example of this in the castle of Montargis, whose construction dates in the 13 th century, and whose plan we give (15). Built on a plain, it commanded the road from Paris to Orleans, that passed through the defended gates A and B. Ditches S surrounded the external defenses. The road was swept in flank by a front flanked by towers and communicating with the castle by a gate C. (Art. Porte). Another gate D passing through a great isolated tower (after a method pertaining to the Loire, and that we s see especially practised in the 14 th century on the lower L Loire and Brittany by the constable Olivier de Clisson), was of very difficult access. As for the internal arrangements of the castle, they are of great interest and clearly indicate the defensive means of the garrisons of French castles. The towers project much from the curtains so as to flank them well; at the north, a salient point and therefore weak, was erected a great work presentiug two thick walls, one behind the other, with a retaining wall flanked by two towers larger than the others. At G was the great hall in two stories in which the entire garrison could be gathered to receive orders, and to

occurred. It is no less necessary to recognize that castle Gaillard was only the citadel of a vast entirety of fortifications designed and laid out by the hand of a master, that Philip August armed with all his power required eight months to reduce it, and finally that John Lackland only made one attempt to relieve it. During the life of Richard, the French army was harassed from the outside, and had no leisure to arrange its attacks with much method; it could only have conquered that important fortress, the bulwark of Normandy, at the price of very great sacrifices, and perhaps it would have been compelled to raise the siege of castle Gaillard before having subdued its outworks. As soon as Philip had possession of this strategic point, so well chosen by Richard, John Lackland only thought of evacuating Normandy, which he did a short time later, without even attempting to guard the other fortresses, that still remained to him in great number in that province, so decisive was the moral effect produced by the taking of castle Gaillard.[1]

Note 1.p.102. Castle Gaillard was repaired by Philip August after taking possession of it, and it is to be believed that he even improved certain parts of the defense. As one can assure himself today, he suppressed the massive rock pier left in the middle of the ditch of the last elliptical enclosure to support the bridge, this pier having aided in taking the g gate of that enclosure. Castle Gaillard was besieged a second time in the 15 th century, and was retaken by king Charles VII from the English, as Alain Chartier relates in his history of that prince. "This month of September (1449), the seneschal of Poitou and Monseignor de Cullant, marshal of France, Pierre de Breze, Denys de Chailly and several others in the presence of the king laid siege to castle Gaillard, where valiant deeds and fine arms were at the arrival. The siege was long. For t this is one of the strongest castles of Normandy, located on the top of a rock adjoining the river Seine; so that no machines could injure it. The king returned in the evening to his lodging at Louviers, and daily while there went to see and f fortify the said siege, for which he caused to be built several forts. And after the fortification the said French lords returned, save the said de Breze and de Chailly, who lived there accompanied by several French archers for the guard of

foot of the wall. On his part the enemy also labored to countermine, and having made an opening, he shot arrows against our miners, and they forced him to retire.[4] The besieged however had not so undermined their wall, that it threatened to fall; but soon a catapult threw against it enormous blocks of stone. Unable to resist this shock, the wall cracked in all parts, and bursting at the middle, a part of the wall fell." The French took possession of the breach, and the garrison being then too few to defend the last enclosure and being surrounded, had not even time to take refuge in the keep and shut itself up there. This was March 6, 1204. Thus Philip August took possession of that castle, which his contemporaries regarded as impregnable.

Note 2.p.101. This is the bridge L.(Fig. 11).

Note 3.p.101. A cat (shed). (Art. Architecture Militaire).

Note 4.p.101. Richard was in error in not arranging slots in the ground story to sweep that bridge, and the cat protecting the French miners from projectiles cast from the top of the wall, the besieged were compelled to form battlements on the wall at the level of the ground of the court.

If we have given nearly the entire description of this memorable siege written by William le Breton, this is because it places in evidence a curious fact in the history of the fortification of castles. Gaillard, in spite of its location and the skill displayed by Richard in the details of the defense, is too compact; the obstacles accumulated in a small area must obstruct the defenders by preventing them from going in a body to the point attacked. Richard abused intrenchments and internal ditches; works accumulated on each other served to shelter assailants, who took them successively; it was no longer possible to dislodge them; by massing themselves behind these defenses acquired, they could approach in force to points so far not attacked, too small to be held by numerous soldiers. Against surprise or a sudden attack attempted by an army in small numbers, castle Gaillard was excellent; but against a regular siege directed by a skilful general, supported by a considerable army and well equipped with machines, having time to make his arrangements and men in great numbers to put them in execution without delay, it must fall quickly after the moment that the first defense was forced. That is what oc-

and another leading to the lower story. In the latter part of the house was a window opening to the country and intended f for lighting the privies." A certain Bogis having seen that window, glided along the ditch accompanied by some brave companions, and helping each other, all succeeded in entering t through that window into the closet located in the ground story. Gathered in that narrow space, they broke through the d doors, and the alarm spread among the garrison occupying the lower court, and believing that a numerous body had invaded the basement of the chapel, the defenders gathered fascines and set fire to them to stop the assailants; but the flames extending into the second enclosure of the castle, Bogis and his companions passed through the burning house and took refuge in the galleries marked G on our plan.(Fig. 11). Roger de Lascy and the defenders being reduced in numbers to 180, were compelled to fly to the last enclosure, driven by the fire. "Scarcely had the smoke diminished a little, when Bogis leaving his retreat and running over the burning coals, aided by his companions cut the ropes and let down the movable bridge rotating on its axis,[1] so as to open a way to the French to escape by the gate. The French then advanced quickly and prepared to assault the high citadel into which the enemy had j just retired in flight before Bogis."

Note 1. p.100. That is the building H drawn on our plan. Fig. 11.

Note 2.p.100. These were the privies; in his prose history the author expresses himself thus:--"because it seemed objectionable to certain religious." The privies were then placed beneath the chapel, and their establishment beside the precipice did not sufficiently protect against scaling, as we shall see. The privies play an important part in the attacks of castles by surprise; thus one will see that in the 13 th and 14 th centuries, they were the object of a quite special study.

Note 1.p.101. This is the bridge marked on our plan and extending from the advanced work to the lower court E.

At the foot of the rock by which one reached this citadel was a bridge cut in the solid rock,[2] that Richard had caused to be cut thus formerly, at the same time that he caused the ditches to be cut. Having moved a machine over this bridge,[3] our men under its protection commenced to excavate under the

primitive construction; because of its enclosed position, it must have remained standing. Probably by it Cadoc could reach the parapet.

Note 1.p.99. As one may see, of the entire advanced work, this concerns the two walls forming an acute angle at their junction with the principal tower A, become lower by following the slope of the ground. The description by William is then perfectly accurate.

Note 2. p.99. The scrupulous fidelity of the narration by William plainly appears, when one examines the point described here. Indeed the ditch is cut in the rock at its bottom; it is about 33 ft. wide by 23 to 26 ft. deep. It is well understood, that the soldiers of Philip August having cast some fascines and baskets of earth into the ditch were impatient, and placed ladders along the outside bank, daring to use these ladders in scaling the other side, hoping thus to reach the base of the tower; but it is evident that the ditch would be partly filled next the outside, while it was not so at the inner side, since this was cut to the bottom of the ditch; hence ladders sufficiently long to descend were not long enough to ascend the other side. The episode of the holes dug with daggers in the inner side has nothing surprising, the rock being chalk mixed with flints. A ledge of about 2.0 ft. existing between the bank of the ditch and the base of the tower could permit bold miners to attach themselves at the base of the work. Again today with the text of William in hand, one follows step by step all the operations of the attack, and he can easily find again the holes pierced by these brave pioneers in the chalk, when they found their ladders too short to reach the top of the precipice.

But the Normans had retired into the castle separated from the advanced work by a deep and wide ditch. It was necessary to undertake a new siege. "John had caused in the previous y year the erection of a certain house ajacent to the wall and placed at the right side of the castle facing the south.[1] The lower story of this house was destined for a service always to be performed in the mystery of the closet,[2] and the upper part serving as a chapel, was consecrated for the celebration of the mass; there was no door on the outside, but inside (opening on the court) where was one for reaching the upper story

which the entire attack is directed; then behind is a movable tower brought forward to batter all the upper part of that advanced work, and to prevent the besieged from remaining there.

"At the extremity of the rock and in the eastern (southeast) direction was a lofty tower (tower A, Fig. 11), flanked at t two sides by a wall terminating in a projecting angle at its junction. This wall extended on a double line from the larger of the advanced works (tower A), and enclosed the two flanks of the lower work.[1] Now see by what a vigorous stroke our men succeed in first making themselves masters of that tower (A). When they saw the ditch nearly filled, they set their ladders there and quickly descended. Impatient of all delay, they then brought their ladders to the other side of the ditch, above which was the tower founded on the rock. But no ladder however long could be found sufficient to reach the foot of the wall, not even the top of the rock, from which rose the foot of the tower. Filled with audacity, our men then set themselves to pierce the rock with their daggers or swords, to make holes in which they could place their feet and hands, and thus gliding along the roughness of the rock, they suddenly found themselves at the beginning of the foundations of the tower.[2] These reaching their hands to their companions following them, they called them to take part en their undertaking; employing the means known to them, they then labored to undermine the flanks and foundations of the tower, always covering themselves with their shields, for fear that the arrows sent against them continually might force them to retreat, and thus sheltering themselves until it was possible to conceal themselves in the holes in the wall, after having long excavated below it. Then they filled these holes with trunks of trees, fearing lest that part of the wall thus hanging in the air should fall and injure them greatly in being weakened; then as soon as t they had enlarged this opening, they set fire to the trees and retired to a place of safety." The shores having burned, the tower partly fell. Roger then despaired of opposing the assault and set fire to the advanced work, retiring to the second enclosure. The French threw themselves upon the smoking ruins at the breach, and a certain knight Cadoc first planted his banner on the top of the half destroyed tower. The little stairway of that tower, visible in our plan, dates from the prim-

bottom. Immediately a road was made of sufficient width by the use of axes, being formed by the aid of beams set side by side, supported at both ends by numerous oak posts set in the ground to form a palisade. Along this road men marched in safety, tr-transporting stones, branches and trunks of trees, heavy lumps of earth with green sod, and piling these for filling the di-tch.(14).[2] Soon arose at various points (a result that none had dared hope for) numerous stone-throwers and mangonels, whose timbers had very recently been but and hewn, and that threw against the walls stones and quarters of boulders whirling t through the air. Finally since the darts, arrows and bolts s sent forcibly from the tops of the walls continually wounded the artisans and laborers, who were transporting projectiles, and were exposed to attack by those of the enemy, there was set between them and the ramparts a palisade of moderate he-ight formed of hurdles and piles connected by pliant willow twigs, so that this palisade protecting the workers should receive the first blows and should repulse arrows diverted in direction. At another side were built towers, also termed belfries, by the aid of many trees and entirely green oaks, that had not been hewn, the axe only having roughly trimmed off the branches; and these towers having been constructed wi with the greatest effort, rose in the air to such a height, that the opposing wall was much troubled by finding itself much below them."

Note 1.p.97. This road is still visible today.

Note 2.p.97. Fig 14 represents a birdseye view of castle Gaillard at the time, when the approaches being nearly comple-ted, the besiegers were arranging to fill the ditch. At A is seen the stockade broken down by Philip August's men to be a able to pass the boats for attacking the islet B; at C is Lit-tle Andely, at E the pond between Little and Great Andely; D are towers of the line of circumvallation traced by Philip August to complete the investment of castle Gaillard; F is t the valley where died in hunger and misery most of the unfor-tunates, who had taken refuge in the castle, and that the gar-rison drove out, so as not to exhaust its provisions. There a are also seen at the end of the road made by the besieging ar-my to reach by an incline the ditch of the advanced work, two great stone-throwers, that batter the projecting tower against

feet of distance as between the first and second towers were found between the second and third, etc. After having furnished all these towers with men and numerous knights, the king also caused the intervals to be occupied by his troops, and on the entire circumference placed sentinels, so that they always w watched, alternating from one station to another; those finding outside then applied themselves to building themselves huts with branches of trees and dry straw after the custom of camps, to shelter themselves from rain, frost and cold, since they must long remain in these places. And since there was but a single point at which they could reach the walls(of the castle) by following a path extending obliquely with various bends,[2] the king willed that a double guard should watch night and d day and with the greatest care over the defense of this point, so that none could penetrate into the camp from the outside, and that none should dare to open the gates of the castle to leave it, without being immediately struck dead or made prisoners."

Note 1.p.96. This passage perfectly explains the site of t the camp of Philip August found at R (Fig. 10), precisely on the top of the hill dominating the rock of Gaillard, and only connected with it by the tongue of land previously mentioned. Besides, one sees the traces of the two ditches of the circum-vallation excavated by the king. These works of blockade have the most intimate connection with those described by Cesar a and executed on the occasion of the blockade of Alesia, they likewise recall those ordered by Titus in the siege of Jerusalem.

Note 2.p.96. This is the path ending at the postern S(Fig. 11); it was indeed the sole entrance to castle Gaillard.

During the entire winter of 1203-1204, Philip August, who knew that the garrison of castle Gaillard still had provisions for a year, decided to undertake a regular siege, "being impatient in his heart." He collected a greater part of his forces on the dominant plateau marked R on Fig. 10. From thence he caused a road to be built in order to level the ground before the tower A (Fig. 11).[1] Then from the summit of the hill to the bottom of the valley and to the borders of the first ditches, the earth was removed by picks with the order to level its rocky unevenness, so that one could descend from top to

the interior of the little castle." The little garrison of t this post not being able to obstruct the progress of the fire, favored by a strong wind from the east, must retire to the boats as they could. After these disasters, the inhabitants of the Little Andely dared not hold out, and Philip August took possession at the same time of the little castle and the city, whose defenses he repaired while he rebuilt the bridge. Having placed a select band in these posts, he went to besiege the castle of Radepont, because his foragers were disturbed by i its garrison, taking it at the end of a month and returning to castle Gaillard. But again allow William le Breton to speak, for the details that he gives of the preparations for that m memorable siege are of the greatest interest.

"However the rocg Gaillard did not have to fear being taken by siege, both because of its ramparts and since it is surrounded on all sides by valleys, by rocks dressed with the pick, by hills with steep slopes covered by stones, so that even if it had no other kind of fortification, its natural position would alone suffice to defend it. The inhabitants of the vicinity then took refuge in that place with all their property, so as to be in greater safety. The king seeing well that all war machines and assaults could not overthrow in any manner whatever the walls built on the top of the rock, applied all his mind to seeking other means of success at any cost and trouble, for possessing himself of that nest of which all Normandy was so proud."

When the king ordered the excavation in the ground of a double ditch on the slopes of the hills and across the valleys, (a line of circumvallation), so that the entire enclosure of his camp might be guarded by a barrier, that could not be passed, and by the help of the greatest labors carrying these ditches from the river to the top of the hill, that was toward heaven, as in scorn of the low ramparts beneath it,[1] placing these ditches at a sufficient distance from the walls (of the castle), that an arrow shot vigorously from a double crossbow could only reach them with difficulty. Then between the two d ditches the king caused to be erected a wooden tower and fourteen other works of the same kind, all so well built and of such beauty, that each of them could serve as an ornament to a city, and further scattered in such manner, tha as many

the middle of the river, resting on the side and placing them just in sequence a little below the ramparts of the castle, and that the rapid current of the water might not move them, they were combined by means of piles driven in the ground and fastened together with cords and hooks. The piles being thus fixed, the king established a bridge on beams carefully framed, "so as to pass to the right bank. Then he built on four ships two towers, constructed of trunks of trees and of great beams of green oak, bound together by chains well stretched, to make both a defensive post of the bridge and a means of attacking the little castle. Then the work being directed with skill on these ships, the towers were erected to such a great height, that from their tops the knights could shoot their arrows down on the hostile walls." (Those of the little castle located at the middle of the island).

Meantime John Lackland attempted to recieve the place; he sent an army corps composed of 300 knights and 3000 cavalry, supported by 4000 infantry and the band of the famous Lupicar.[2] This body threw itself by night on the walls of Philip August, routed the rabble, and would certainly have driven into the river the camp of the French, if they had not been protected by the intrenchment of some knights, going to kindle great fires everywhere, and if they had not rallied a fine corps, that resumed the offensive and drove the enemy outside the lines. A Norman flotilla to operate simultaneously against t the French arrived too late; it could not destroy the great wooden towers built in the middle of the Seine, and was obliged to retire with great loss.

Note 2. p.94. Old French poem.

A certain Galbert, a very skilful swimmer," continued William le Breton,"having filled vessels with burning coals, closed them and rubbed them with bitumen on the exterior so skilfully, that it became impossible for water to enter them. Then he fastened around his body the cord suspending the vessels, and plunging into the water without being seen by anyone, he went secretly to land at the palisades built of wood and oak, toward the side of the rock Gaillard opposite the castle, and that was defended by no one, the enemy not having feared an attack at that point. Immediately the fire attacked the w wooden beams forming the intrenchments and the walls enclosing

details least important apparently, thus possessing what makes great men, namely; correct views in the general conception, o care and even research in the execution of the details.

In all these works is found neither sculpture nor mouldings; all has been sacrificed to defense; the masonry is well built, composed of a flint rubble connected by excellent mortar, faced with a surface of small ashlars carefully executed and p presenting at some points alternate courses of white and reddish stones.

While Richard lived, Philip August, in spite of his well ac acquired reputation as a great conqueror of fortresses, dared not lay siege to castle Gaillard; but after the death of that prince, and when Normandy had fallen into the hands of John Lackland, the French king having resolved to possess himself of this military post, that would open to him the gates of R Rouen. The siege of the place as told in the most minute detil by Willian the Breton, chaplain of the king, an eyewitness, was one of the greatest military feats of the reign of that prince; and if Richard showed remarkable talent in the general arrangement and details of the defense of that place, Philip August conducted his undertaking as a consummate warrior.

The gloomy John Lackland did not know how to profit by the strategic arrangements of his predecessor. Philip August descending the Seine found the peninsula of Bernieres unoccupied; the Norman troops being two few to defend it, threw themselves into the little castle and Little Andely, after having broken down the wooden bridge connecting the banks of the river. The Frence king commenced by establishing his camp in the peninsula opposite the castle, resting his left on the village of Bernieres and his right on Toëni (Fig. 10), connecting these two posts by a wall, whose traces K L are still perceived today. To be able to receive the flotilla intended to provision his camp, Philip caused the stockade barring the river to be broken by skilful swimmers, and this under a storm of projectiles shot by the enemy.[1]

Note 1.p.84. Old French poem.

"Immediately afterwards," says William le Breton, "the king ordered large ships to be brought, such as we saw sailing on the course of the Seine, and that ordinarily transported animals and wagons along the river. The king had them sunk in t

who had fallen to the bottom.

Note 2.p.90. The structures are now torn down to the level of the point O (Fig. 13), it is probable that defensive galleries or bays were placed at the top of the outer part of t the segments in case of war, as we have indicated at B, so as to sweep the ditches, to hit their bottoms, thus preventing t the miner from staying there.

The plan of a portion of the elliptical wall (Fig. 12), is thus of great interest; its layout indicates on the part of its author care and research, study and experience of the effect of casting equipment, that left nothing for surprise. T The portions of a cylinder composing that curtain do not descend vertically to the bank of the ditch, but intersect portions of cones near the base, so that the reentrant angles between these cones and the intermediate walls cannot shield a miner. Finally the line drawn through the axes of the lateral slots A fixed the points B of the intersection of the bases of the lower cones with the slope of the foot of the wall. F Further, by the slots A one could see a miner at the tangent point D by the arrangement of the several surfaces, as indicated by the line C D. If the cylindrical portions had descended vertically, or if these segments had been portions of a cone without warped surfaces and without change of curves, as indicated at X, Fig. 12 (assuming no batter exceeding that given to the rampart of castle Gaillard, so as not to facilitate scaling), the triangles P would have been sheltered from shots fired in the axes of the lateral slots A. By these very subtle intersections of cylinders and cones, visible in Fig. 13, Richard uncovered all points of the base of the curtain for a continuous flanking, which was very important in a time when the attack and defense of strong places only became serious when they were very closely approached. Today all military engineers tell us that the layout of a bastion, its profiles well or badly calculated, may have a considerable influence on the longer or shorter resistance of a place attacked. This minute care devoted by Richard in tracing the last defense of castle Gaillard, a defense that only foresaw an attack at the base of the work by sap and mine, indicates sufficiently to us the special genius of that warrior, knowing how to calculate and foresee, attaching considerable importance to

enclosure of castle Gaillard, that surrounding the keep on the tree north, south and east sides, that one can particularly recognize the putting into practice the ingenious ideas of R Richard.

Note 3.p.88. "See how beautiful is my daughter of a year!" Bromton. Hist. Angl.Script.antiquity. Col. 1276.-- Hist. de chat. Gaillard by A. Deville. As Guill. Guiart says it was:-- (Old French poem, p. 89).

We shall at once see how this combination of defenses on a small area was precisely in great part the cause of the taking of castle Gaillard.

If we cast our eyes on the plan in Fig. 11, we notice the singular form of the last elliptical enclosure; this is a series of segments of a circle with chords of about 10 ft, separated by curtain portions of only 3.3 ft. In plan each of t these segments gives the following figure (12), that presents a very strong continuous flanking, with regard to the shooting arms of that epoch, as indicated by the dotted lines. In elevation this crooked wall, whose base rests on the rock dressed with the pick, is formidable in appearance.[1] (13). No slot is opened in the lower part; the entire defense is arranged at the top.[2] The defenses of the keep are no less interesting to study because different from all those adopted before Richard (Art. Donjon), and that they are particularly combined in view of a very near attack. Richard seems to have sought i in the construction of the defenses of castle Gaillard, to secure himself against the work of the miner; indeed the mine and sap were then (in the 12 th century) the means most generally employed by besiegers to breach the walls of a strong place, for casting machines were not sufficiently powerful to breach walls however thin. One notes that Richard, in view of that means of attack, desired to carefully flank the bases of the curtains, not trusting entirely to the natural precipice and to the depth of the ditches to stop the assailant.

Note 1. p.89. Jean de Marmoutier, a monkish chronicler of the 12 th century, relates that Geoffrey Plantagenet, grandfather of Richard the Lionheart, besieging a certain strong castle, studied the treatise of Vegetius.

Note 1.p.90. Old French poem. Indeed the ditches were cut with the pick, and as William says, no one could go to seek

of the river at T rise towers and walls cut in the rock and furnished with parapets. A tower V abuts against the rock at that point and is connected with the wall X, that bars the foot of the precipice and the banks of the Seine by being joined to the stockade designed to stop navigation. The great ditch Z descends to the bottom of the precipice and is artificial; it was intended to prevent the enemy from marching along the river, masking himself by the projection of the rock, to come to break through the wall or set fire to the stockade. This ditch could also cover a sortie of the garrison toward the river, and was in communication with the cellars G by means of the subterranean passages already mentioned.

Note 1.p.88. These four towers are now torn down; one can only find the plan and some portions still standing.

Note 2.p.88. The traces of the defenses of this covered passage are scarcely visible today. We have taken care to indicate only by a line the works completely destroyed.

One year sufficed Richard for finishing castle Gaillard and all defenses connected therewith. "How beautiful is my daughter of a year!" cried the prince when he saw his undertaking finished.[3] Examination alone of this plan causes one to see that Richard nowise followed the Norman traditions in the construction of castle Gaillard, and one cannot doubt that not only the general arrangement but also the details of the defense were ordered by that prince. That very important advanced work, that extends an angle toward the tongue of land, recalls the external enclosures of the keep of Roche-Guyon; but the ditch separating that work from the body of the place, which it entirely isolates, the flankings obtained by the towers, belong to Richard. Until then the flankings in castles of the 11 th and 12 th centuries are weak, so far as we can judge; the constructors appeared to be preoccupied in defending their enclosures by the enormous thickness of the walls, far more than by good flankings. Richard perhaps first sought a system of walls independent of their force of passive resistance. Had he brought from the East this knowledge very advanced for his t time? That is difficult for us to know. Was this a remnant of Roman traditions? [1] Or indeed had that prince in consequence of practical observation found in his own genius ideas, of which he then made such a remarkable application? In the last

completed accoring to his projects. At A opposite the tongue of land connecting the site of the castle with the adjacent height, he caused to be excavated a deep ditch in the rock, and he built a strong and lofty tower with parapets reaching the level of the dominant plateau, so as to command the top of the bank. This tower was flanked by two smaller ones at B; the curtains A D descend in following the natural slope of t the rock; the tower A then commands the entire advanced work A D D. A second ditch, also cut in the rock, separates that advanced work from the body of the place. The enemy could not think of establishing himself in this second ditch, that was swept and dominated by the four towers D, D, C, C. The two t towers C, C certainly commanded the two towers D, D.[1] It is noted that the advanced work did not communicate with the outside, but only with the lower court of the castle. That was an arrangement entirely Norman, that we found at Roche-Guyon. The first enclosure E of the castle behind the advanced work, and communicating with that only by a wooden bridge, contained the stables, barracks and chapel H; this was the lower court. A well was dug at F, under the area of the court at G a are excavated in the rock the vast cellars, with ceilings supported by piers left, and these receive light from the ditch I of the castle, and communicate with the outside through two passages cut in the chalk. At K opens the gate of the castle; its sill is carried about 7 ft. above the edge of the ditch L. This gate is masked from the enemy, that had taken the first portal F, and that could not come to attack it except by exposing the flank to the curtans I L, and the rear to the tower placed before this gate. Further from the time of Richard, a work set on a mass reserved in the rock in the middle of the ditch covered the gate K, that was still further closed by a portcullis, folding doors, and protected by two guarded posts. The keep M rose opposite the entrance K and swept it. The apartments of the commandant were placed at N on the side next the cliff, i.e., at that side of the castle at which the defense could be neglected aud windows be opened. At P is a postern for assistance, well masked and protected by a strong de defense O. This postern does not open directly to the exterior but into the covered way R pierced by a second postern at S,[2] which was the sole entrance to the castle. From the bank

that was soon filled with houses and took the name of Petit-Andely. A pond was formed at D by retaining the waters of the two streams and completely isolated the bridgehead. Grand Andely E, that already before these works was also fortified a and enclosed by moats still to be seen, and filled by the waters of these two streams. On a promontory elevated more than 328 ft. above the level of the Seine, and that was connected with the chalky ridge only by a narrow tongue of land on the south side, the principal fortress was located while profiting by all the projections of the rock. Below the precipice and swept by the castle was a stockade F composed of three rows of piles, and barring the course of the Seine.[1] This stockade was further protected by palisade works established at the edge of the right bank and by a wall descending from a t tower built at the middle of the bank down to the river;[1] further up stream and like a patrol on the shore of France, a f fort was built on the bank of the Seine at H, and took the n name of Boutavant. The peninsula being fortified at the neck and guarded, it was impossible for an armed enemy to find the site for a camp in a land full of ravines and covered by enormous rocks. The valley between the two Andelys was filled by the abundant waters of the streams, commanded by the fortifications of the two cities located at its extremities, dominated by the fortress, and could not be occupied, no more than the slopes of the surrounding hills. These general arrangements having been undertaken with as much skill as rapidity, R Richard devoted his entire care to the construction of the principal fortress, that should command the entirety of the defenses. Placed as we have stated on the end of a promontory with very steep sides, it was only accessible by that long tongue of land, that joined the extreme plateau to the chalky ridge; all of Richard's attention was at first devoted to this side, that might be attacked.

Note 1. p. 84. The internal parts of this work still exist. (Old French poem). Guill. Guiart. Branche des roy. lignages. Verses 3162 et seq.

Note 1.p.86. (Old French poem). The same. Verses 3299 etc.

See (11) the arraugement of these defenses; for it must be stated, that the Anglo-Norman king himself supervised the erection of this castle, directed the workmen, hastened their labors, and never left them till the work was completed acc-

sustained against Philip August in 1203 and 1204, by A. Deville. Rouen. 1849.

From Bonnieres to Gaillon the Seine descends in nearly a s straight lineto the north northwest. Near Gaillon it turns abruptly to the north northeast as far as Andelys, then returns on itself and forms a peninsula, whose neck is only 2843 yds. wide. The French, by the treaty following the conference of Issondun, possessed on the left bank Vernon, Gaillon, Pacy-sur-Eure; on the right bank Gisors, which was one of the strongest places in that part of France. An army with corps collected at Evreux, Vernon and Gisors, would be simultaneously carried to Rouen along the Seine, followed by a flotilla, and by a march of two days could invest the capital of Normandy and provision itself by the Seine. To plant a fortress across the river between the two places of Vernon and Gisors opposite a peninsula easily guarded was to intercept the navigation of the river, to divide the two invading corps, to render impossible their communication with Paris, and to place them in the shameful alternatives of being beaten separately before arriving under the walls of Rouen. Thus in circumstances so unfavorable as those in which Richard found himself, the position was perfectly chosen. The peninsula of Bernieres opposite Andelys could easily be fortified across the neck and supported by a strong place on the other side of the river, permitting the establishment of a camp provisioned by Rouen, and that one could not think of forcing. The city of Rouen was c covered, and if Philip August had the intention of marching on that place, he could not do so without casting a look of anxiety on castle Gaillard, which he left between himself and France. This brief description already shows that Richard was better than a captain of exalted bravery.

See how the Anglo-Norman king arranged the entirety of the defenses of this strategic point (10). At the end of the peninsula A, on the right bank of the river, the Seine flows along very high precipices of chalky rocks, that dominate the entire plain of alluvium. On an islet B dividing the river, Richard at first built an octagonal fort with towers, moats a and palisades;[1] a wooden bridge passing through this little castle united the two banks. At the end of this bridge, at C on the right bank, he built an enclosure, a great bridgehead,

king, in spite of its ruinous state. A bad politician, Richard was a consummate warrior, and the repaired the faults of the statesman by courage and perseverance. In our opinion castle Gaillard of Andelys exhibits a part of the military talents of Richard. One is too much disposed to believe, that this illustrious prince was a fighter, brave to rashness; it is not alone with the qualities of a good soldier, chiefly paying in his own person, that one acquires such a great place in history. Richard was better than a Charles the Rash, he was a hero with bravery under every test; he was also a skilful captain whose eye was sure, an engineer full of resources, experienced and foresighted, capable of forestalling his century, and never submitting to routine. Thanks to the excellent work of M. A. Deville on castle Gaillard,[1] every one can have an accurate account of the circumstances, that determined the construction of that fortress, the key of Normandy, a frontier post capable of arresting for a long time the execution of the ambitious projects of the French king. The right bank of the Seine being in the possession of Philip August as far as Andelys, a French army could in one day find itself in the heart of Normandy and menace Rouen. Perceiving this danger too late, Richard wished to guard his province on the continent. With that view that belongs only to great captains, he chose the site of the fortress destined to cover the Norman capital, and once that his project was decided on, he pursued its execution with a tenacity and will, such that he broke through all obstacles opposed to his enterprise, and that in a year not only was the f fortress built, but also a complete system of defensive works was placed with rare talent on the banks of the Seine, at the point where that river could cover Rouen against an enemy leaving Paris. We again find there the qualities that distinguish Norman fortifications, but put in practice by a man of genius. Here is concerned not the defense of a domain, but that of a great province, of a military post as good for protecting a capital against an enemy as to surprise and attack him, and t that under the most unfavorable conditions of delimitation of frontiers. Our readers will therefore be willing to permit us to extend a little concerning the position and construction of castle Gaillard.

Note 1. p. 83. Hist. du chat-Gaillard and of the siege it

G and the precipice I were ever protected by walls, but only by a bank of earth with palisades, for no trace of masonry r remains at these points. To better comprehend again the site of the castle of Roche-Guyon, and how by extensive works men succeeded in making this location yet stronger, either by cutting away the hill or by terracing, we give (9) a profile of the chalk with its structures. At A is the Seine, at B the c castle built at the foot of the cliff, at C the keep, whose enclosures rise in following the natural slope of the plateau to dominate the exterior at the side D. At E is the artificial mound on which was an advanced work commanding the wall a around the plateau; the profile of the subterranean passage from the castle to the keep is traced at H. One could enter f from the plateau the enclosures of the keep only by a postern opened at the flank of the external curtain on the right and facing the precipice, so that it was impossible to see that entrance from the plateau or from the bottom of the cliff.(Art. Donjon). Our profile shows how difficult it would be for a besieger to hold the lower castle without at the same time possessing the upper keep; if after taking the castle he desired to remain there, he would infallibly be crushed by the garrison of the keep. As for taking the keep, surrounded by its d double enclosure, this could only be attempted by a blockade. But how could be blockaded a fortress possessing a very practicable subterranean exit communicating with a lower dominated defense and a wide river? In strategic respects the position of castle RocheGuyon was then excellent and evidently chosen to guard that peninsula of Bonniere, so easy to defend at the narrowest place. Two or three thousand men in the peninsula and four or five hundred men in the castle and its dependances would naturally assist each other, although separated by the Seine, could stop a formidable army and paralyze its movements on both banks of the Seine.

At a few miles from Roche-Guyon and down the Seine, we find a castle with a stronger and better chosen strategic position that that of Roche-Guyon; this is castle Gaillard near Andelys. Built by Richard the Lionheart after that prince had recognized his fault by the treaty of Issoudun in leaving to Philip August the Vexin and the city of Gisors, this castle still re retains the impress of the military genius of the Anglo-Norman

that of castle Gaillard.

Below Mantes the Seine Runs west; at Rolleboise it turns n northeast and forms a vast bend, returns southwest, thus leaving on the left bank a peninsula of alluvium, whose length is about 5 miles and width over 2.5 miles. The neck of that peninsual has scarcely 1.25 miles in width. That was an excellent place for a camp, for an army camp, whose right rested on Bonnieres and left on Rolleboise, and could without difficulty defend the entrance to that peninsula. But it was necessary to firesee that an enemy in force by attacking the entrance by marching along the right bank, could attempt to pass the Seine at the end of the plain of Bonnieres, and thus take the peninsula at its two most distant points. Now the right bank opposite the peninsula of Bonnieres was composed of an abrupt chalky precipice, that approaches the Seina at Vetheuil to l leave it at Roche-Guyon at the extreme of its bend. On this point at Roche-Guyon the precipice is only about 110 yards d distant from the river; formerly it was still nearer, the Seine having withdrawn its banks.

There at the end of the 12 th century was erected a castle under excellent conditions. First (3) a very strong keep surrounded by a double enclosure was built at the top of the precipice at A; at B along the river and abutting against the rock that rises much higher, rose the castle that cut the road passing along the right bank, commanded the course of the river and consequently the tip of the peninsula.[1] In order to c connect the castle and the keep, the chalk cliff was cut away with the pick, so as to leave a sufficiently large court between the principal structure and the foot of the rock. A broad subterranean winding passage cut in the rock and having the form of a stepped cylinder connected the defenses of the castle to the internal court of the keep. At the side where the precipice was less steep, at F was fully cut in the rock a wide and deep ditch. At G was a ditch of less depth, but much more extended, outlining the plateau at the end of which stood the keep; but since this plateau was not level and it dominated the keep sunk in the chalky ridge, at C was built an artificial mound on which (probably) rose a defense, now destroyed. At I and H the natural precipices removed all idea of attacking the plateau at the sides. We do not think that the ditch

explains the rapidity with which were constructed these military posts and their prodigious number; but it also explains how in the national revolts carried on with energy, the Norman garrisons holding these places were compelled to take refuge in the keep after the external defenses were taken, that only presented a weak obstacle to a numerous and determined band, were soom reduced by famine, defended themselves badly in a contracted area, and were forced to surrender at discretion. During his reign and in spite of his prodigious activity, William could do no more in the extent of a vast country always ready to rebel; his successors had more leisure to study the location and defense of their castles; they profited by it, and soon the Norman castle increased and perfected its external defenses. The keep assumed less relative importance; it relied more on secondary works, and protected them in a more effecient way; better yet, the entire castle was only a vast keep with all its parts combined with art and made independent of each other, although protected by stronger construction. Men commenced then to apply this law, "that all that defends itself must be protected."

It is necessary then for us to reach the end of the 12 th century to find the true feudal castle, i.e., a group of buildings erected as a whole, separately defending themselves although connected by an idea of a common defense, arranged in a certain order, so that when one part was taken, the others still possessed their complete means of resistance, their resources in storehouses of arms and provisions, their free exits either to make sorties and to take the offensive, or for the garrison to escape, if it could hold out no longer. We s shall see at once how this programme realized with difficulty was fulfilled with rare sagacity by Richard the Lionheart during the last years of the 12 th century, when he caused the building of the important place of castle Gaillard. But before occupying ourselves with that remarkable fortress, we must s speak of a castle appearing earlier to us, which is like the transition from the primitive castle (which possessed only a keep with an enclosure more or less extensive and following the shape of the site) and the feudal castle of the 13 th c century. This is the castle of Roche-Guyon, located at 9.5 m miles below Mantes on the Seine. Its site is also the same as

than a castle. This arrangement is apparent not only in Normandy and England, as at Pin, S. Laurent-sur-Mer, Nogent-le-Rotrou, Domfront, Falaise, Chamboy, Newcastle, Rochester and Do Dover (England), but on the coast of the West, in Anjou, Poitou and Maine, i.e., in all provinces into which Norman influence penetrates; we shall find it again accompanied by the Norman moat, whose character is so clearly decided, at Pouzanges, Blanzac, Broue, Pons, Chauvigny near Poitiers, and even at Montrichard, Beaugency-sur-Loire and Loches. (Art. Donjon). The external defenses accompanying these great rectangular k keepseither present only terraces without traces of important structures, or if they are built of masonry are all later by at least a century from the establishment of these keeps, which indicates with sufficient clearness that the primitive enclosures of the 11 th and 12 th centuries had little importance, and that they must have been replaced, when in the 13 th century this defensive system of the castles was modified, and w when was recognized the necessity of enlarging and of strengthening the external works.

We give (6) the plan of the castle of Chauvigny, whose keep dates from the 11 th century and the greater part of the external defenses from the 14 th; and (7) the plan of the castle of Falaise, whose square keep A of the 11 th century alone presents a strongly defended residence. As for the other defenses of this castle, they only assume some value by the arrangement of the precipices of the terrace, and they follow all its outlines. The cylindrical keep B and the defenses on the left d date from the English invasion, i.e., from the 14 th and 15 th centuries. The castle of Falaise in the 12 th century actually consisted only of a great keep with an enclosure containing secondary buildings, probably constructed in the simplest fashion, since there no longer remains a trace of them, and intended for the barracks of the garrison, for storehouses, stables and other dependences. The name of hall (aula) may th then be given to this castle, since indeed the sole important part, the residence of the lord, is only a fortified hall. T The castles of William the Conqueror built in the cities of E England to keep the city people in awe, were nothing more than rectangular keeps, well fortified and surrounded by earthworks, palisades or external enclosures with no great strength. That

of the sovereign fall on others than themselves, sought to r render their castles more formidable, in order to sell their services more dearly to the rivals of their sovereign, and to make common cause with them: (old French poem).

Thus by reason of the feudal organization even in Normandy, where the national spirit maintained itself much better than in France, the nobles daily endeavored to make their castles stronger, so as to free themselves from all dependance, and be able to dictate conditions to their sovereign. The Norman castle of the 11 th century only consisted of a square or rectangular keep, around which were built some works of little importance, especially protected by that deep ditch excavated at the summit of a precipice, that was the true Norman post of that epoch, designed to dominate a territory, to close a passage or restrain the people of cities. Castles furnished with defenses as extensive as those of Arques were rare; but the Norman barons becoming feudal lords in England or on the continent, soon saw themselves sufficiently rich and powerful to greatly increase the dependences of the keep, that in its origin was the only point seriously fortified. The primitive enclosures were often made of palisades, and were then replaced by walls flanked by towers. The most ancient written documents concerning the manors and even the castles (documents that in England go back to the 12 th century) frequently designate the fortifed residence of the lord by the word aula or hall; indeed this sort of military establishment consisted o only of a hall protected by thick walls, battlements and buttresses furnished with round turrets or flanking bays. The dependances of the lord's residence had relatively but little importance; in case of serious attack, the garrison soon abandoned the external works, and shut themselves within the keep, whose means of defense were formidable for that epoch. During the course of the 12 th century, that tradition is preserved in the countries in which Norman influence predominates, the keep, the fortified hall assumes a comparative value, that we do not find in the same degree on French territory; the keep is better isolated from the secondary defenses in the Norman castle of the 11 th and 12 th centuries than in the castle of French origin; it is higher and presents a more imposing mass; it is a post around which is arranged a fortified camp rather

had to besiege it, his uncle having openly declared against him. Not being able to attempt to take the castle by force, the Bastard of Normandy undertook a blockade. For this purpose, he had excavated a ditch of contrevallation, that starting from the ravine at the northeast passed before the North gate of the castle, descended to the river Varenne, and reascended in the direction from the southeast toward the ravine. He furnished this ditch with outworks to lodge and protect his men against attacks from within and without;(see old French poem in text).

After a fruitless attempt of the king of France to raise t the blockade, count William was obliged to surrender for lack of provisions; (old French poem in text).

It was indeed scarcely possible with the means of attack t then at command, to take a castle so well defended by nature and by formidable works of art.

We give (5) a birdseye perspective of the castle of Arques, such as it must have been in the 11 th century, taken outside the Dieppe gate, and omitting the defenses added later at that side. Then will be more easily understood the internal arrangements of this strong place.

Already from the time of William the Bastard, the Norman b barons then erected vast castles of masonry possessing all t that constitutes places of that kind in the middle ages:-- deep moats skilfully excavated, lower and upper courts, keep, etc. The duke of Normandy, during the long struggles at the beginning of his reign built castles, or at least keeps, to bridle the cities that had taken part against him; (old French text).

After the descent in England, the establishment of castles was one of the means, that William the Conqueror employed to ensure his new kingdom, and it was in great part by these fortresses erected on strategic points or in the cities themselves, that he owed the power of maintaining himself in the midst of a country, that attempted daily revolts to drive out t the foreigners and reconquer its independence. But many of the nobles, from the moment the general war ended, holding t their castles as fiefs, quarreled with their neighbors, made forays on the lands of others, and attacked them in their strong places. Or indeed being displeased by seeing the favor

defense. At K is the second gate which communicates with the external terrace by a bridge placed on isolated piers. That entrance is sagaciously arranged, passes under a tower and t through a long vaulted passage well defended and swept by the keep, that by its oblique position masks the court of the castle to those coming in from the exterior. This keep is further very remarkably located to command the exterior of the side of the tongue of land,by which one can approach from the ditch on the level; its angles touch the ramparts of the enclosure, thus leaving but a very narrow passage on the top of the wall, and dominates the bottom of the ditch. The enemy, if possessing the court L, could not ascend the part M of the ramparts, and with difficulty would reach the postern K, that was especially reserved for the garrison enclosed in the keep. At P rises a work dependent on the keep, covering the passage to the postern, and which could defend itself as well against t the internal court O as against the exterior. This had several exits impossible to be recognized by men unfamiliar with these turns; for besides the postern K of the keep, a subterranean stairway communicates with the bottom of the ditch, a and thus permits the garrison to make a sortie or to escape without being seen. We have indicated at N on our plan the n numerous subterranean passages cut in the chalk and yet visible, that intersect beneath the ramparts, and are intended e either for making sudden sorties into the ditches, or to prevent the work of the miner at the side at which the castle is most accessible. From the gate D to the postern K, the terrane om which is placed the castle of Arques rises gradually, so that the keep is built on the highest point. Outside the postern K, on the tongue of land connecting the promontory to the mass of the hill, were erected earthworks with palisades, traces of which remain, that must further have been modified in the 15 th century, when the castle was equipped with artillery.

Note 2. p. 71. The plan is completed in what concerns the internal structures, by means of the plan deposited in the archives of Dieppe, drawn at the beginning of the 18 th century, and reduced by M. Deville in his History of the Castle of Arques. Rouen. 1839.

The castle of arques was scarcely built, when duke William

bottom of the ditch, the Normans took care to pierce longitudinal galleries S, that permitted hearing and stopping the work of the miner at the base of the precipice. At Arques these subterranean galleries are entered at certain points of the internal defense, after numerous turns, that it was easy to fill up in an instant, in case the assailant could succeed in possessing himself of one of these galleries. This important arrangement is one of those characterizing the sites of Norman castles during the 11 th and 12 th centuries. This d ditch made by men and cut in the chalk is not less than 82.0 to 98.0 ft. wide from the crest of the counterscarp to the b base of the walls. The topographical plan (3) explains the position of the castle of Arques better than a description could do. On the western side the natural valley is very deep and the precipice of the promontory is steep; but on the side of the village to the northeast, the slopes are less steep, and they extend quite far to the little river Arques. At this point the slope A of the hill was defended by an external enclosure, a true lower court, designated in the texts by the name of Bel or Bailey.[1] A gate and a postern alone gave entrance to the castle at the north and south.

Note 1.p.69. See Latin text.

Note 1.p.70. Book 7. Chapter 1.

Note 1.p.71. Considerable remains of this external enclosure may yet be seen, particularly on the side of the gate toward Dieppe.

Here (4) is the plan of the castle of Arques.[2] The advanced work B dates from the 15 th century. The internal buildings C appear to be of a quite recent epoch; they no longer exist now. From the time of William of Arques, the actual entrance of the castle from the side of Dieppe was at D, and the ditch must then follow the dotted line E E'. Perhaps at B existed an advanced work of palisades to protect the principal gate. One perfectly distinguishes beneath the entrace gate the structures of the 11 th century, and even the substructures of the t towers that defended it. At H is the keep of square form, conformably to Norman customs, and divided by a thick partition wall. But we shall have occasion to return to the details of this remarkable structure in Art. Donjon; we must here only indicate the general arrangement, that pertaining to the entire

century from a military point of view. The castle of Arques near Dieppe will serve us as a starting point, for we find again there in its location and combinations of details the primitive Norman principles of defense. On the southwest slope of the valley of Arques at some miles from the sea is detached a ridge of chalky earth, that forms a sort of promontory protected by nature on three sides. At the end of the promontory, William,[1] uncle of William the Bastard, in consequence of the gift of the county of Arques by his nephew to him about 1040, erected the fortress, whose importance we shall endeavor to make understood. Perhaps a castle already existed at this p point; of structures preceding this there remains no trace. William of Arques, full of ambition, acknowledged the gift of his nephew by seeking to take from him the duchy of Normandy; in that he followed the example of most Norman nobles, who seeing at the head of the duchy a young man scarcely past adolescence, prepared himself to take from him an inheritance, that did not seem due to his illegitimate birth. Indeed, "in the first time of the life of William the Bastard," says William of Jumieges,[1] a great number of erring and faithless Normans erected intrenchments in many places, and constructed strong fortresses." Without losing time, and before disclosing his projects of a revolt, William of Arques set himself at work, and a few years after investiture in his county, the village of Arques at the end of the ridge of land dominating it saw aries a vast fortified enclosure, protected by deep moats and a formidable keep. But here appeared first the Norman genius. Instead of profiting by all the space given by t the end of the chalky promontory, and of regarding the precipices and valleys surrounding it as a natural moat, as a French nobleman would have done, William of Arques caused a wide ditch to be dug at the top of the hill, and on the bank of t this ditch he erected the enclosure for his castle, leaving as indicated in Fig. 2, a ridge A between the valleys and his defenses, this being a sort of covered way 6.6 ft. wide, behind which after having climbed the natural slopes B, the assailant found an impassible obstacle between him and the walls of the castle. The ridges A were further equipped by palisades, which protected the covered way and allowed it to be supplied with defenders, as seen at C at little above the level of the

aggression, he called around himself the noble vassals and e even their sub-vassals, tenants and peasants.[1] Then the vast fortified enclosure surrounding the keep was occupied by huts built in haste, and it became a fortified camp in which each one brought all that he held most precious, provisions and everything necessary to sustain a siege or blockade. This explains those extensive defenses that seem built to contain an army, although traces of habitations are scarcely found there. Yet the Normans conceived the fortress with political views as well as personal ones; the French nobles profited by the sagacity displayed by the Norman barons in their military works, but only with the ieda of defending the domain, of finding a safe asylum for themselves, their family and their men. The Norman castle long retained the qualities of a fortress combined so as to defeud itself against the foreign assailant; its site is chosen to command passages, intercept communications, divide an army corps, and protect a territory; its internal arrangements are comparatively spacious, desegned to contain numerous companies. The French castle is built only with a view to the protection of the feudal domain; its site is selected to protect itself alone; its internal arrangements are complicated, contracted, emphasizing habitation rather t than defense; they indicate the work of men gathered in small numbers, all their intellectual faculties preoccupied by a single thought, that of personal defense. The Frence castle is like a group of castles, which at need can defend themselves against each other. The French nobleman adopts in the 12 th century the crafty spirit of the Norman, and he applies it to the least details of his residence in dwarfing it, so to speak.

Note 1.p.68. The sub-vassals and tenants are free men; the first holding lands by hereditary right and paying a rent to the lord; the second possesses a less important holding, a house, court and garden, paying the lord for enjoying it by payments in kind; if they were in the country, or by a duty of boarding, if they were in a city. The condition of the tenants further differed little from that of the peasant.

After tracing this general view, we shall pass to the examination of the monuments. We will first occupy ourselves with the Norman castle, that most advanced in the course of the 11 th

who lent him the aid of their arms, to attract and retain them near him by the allurement of an increase of property, by the hope of an encroachment on the lands of his neighbors. He did not even have servants at wages, because his revenues in great part were paid in kind, the daily service of his castle was done by men on his lands, who owed him, one the sweeping, another the clearing of the drains, these the care of his stables, and those the bringing of his wood for warming, the baking of his bread, the cutting of his hay, the trimming of his hedges, etc. Retired within his keep with his family and some companions, most of his relatives being poorer than himself, he could not be certain that his men at arms, whose service was temporary, seduced by the promise of some neighbor, might not open the gates of his castle to a hostile troop. That strange existence of the feudal nobility justifies this system of mistrust, the impression of which has been retained by his residence; and if today that social organization seems to us absurd and odious, it is still necessary to argue that it was arranged to develop the moral force of individuals, to discipline the people, that it was perhaps the only way, that did not lead from barbarism to the most shameful corruption. Let us then be just, never casting a stone at those habitations overthrown by popular hate, as well as by monarchical power; on the contrary let us see in it the cradle of our national energy, of those warlike instincts, of that contempt for danger, which have assured the independence and greatness of our country.

Note 1. p.67. The tenants in kind had the care of the cattle and mills, the harvesting of the wheat and hay, dues in kind like capons, eggs, trimming hedges, certain transportation, etc.

One conceives that this social state must have been accepted by the Normans, when they settled on French soil. And indeed since Rollo each Norman noble yielded to the customs of the people among whom he had established himself; for to live there it was not his interest to depopulate his domain. It is to be believed, that he changed nothing in the tenures of the fiefs, which he enjoyed by right of conquest, for from the beginning of the 12 th century we see the Norman noble in time of peace surrounded by a small number of families, dwelling in the hall, the fortified keep; in time of war when he feared

power; a stranger to the general interests of the country (interests that he cannot understand, since they scarcely manifested themselves in the 12 th century), he lives alone; those surrounding him are neither soldiers, servants nor equals; t they depend on him to a certain limit, that is not clearly d defined in most cases. He does not pay men owing him service in war, but the duration of this service is limited. The noble having a fief counts several classes of vassals; some, like the knights, owe him only homage and the aid of their hands in case of an appeal to arms, or a sum intended to relieve them from this service, and again it is necessary that this be not to aid in an undertaking against the sovereign. Other common tenants holding free lands must pay rents to the lord, with the privilege of dividing this land into lots, just as are the principal lessees. Other tenants, the villeins, of an inferior class, the peasants, the tenants in kind,[1] the lowest in the feudal scale, owe service of all kinds. This diversity in the rank of individuals,in the division of the soil and t the product the lord derived from it, introduced infinite complications, therefore perpetual difficulties, abuses, impossible oversight and consequently arbitrary acts, for that state of things in an epoch when administration was a scarcely known science, was often prejudicial to the nobleman. Let us add to this that the lands of the nobles, those in the hands of the knights, found themselves subject to a guardian during the m minority of the lord, i.e., the sovereign enjoyed during that time the revenues of his lands. If today with uniform taxation an army of officials is necessary to ensure regularity in the revenues of the State, and a long habit of unity of government, one will comprehend what must occur in the 11 th and 12 th c centuries in the administration of a feudal domain. If the l lord were compliant, he saw the source of his revenues diminish daily; if on the contrary he were avaricious of gain, he cut through difficulties by violence, which was easy for him, since he combined in his hands the rights of finance and of judging. To live and maintain himself in such a condition of society, the nobleman was led to mistrust all and everything; scarcely could he count on the devotion of those who owed him military service. To acquire this devotion it was necessary for him to tolerate numberless abuses by his vassal nobles,

which always remained opposed to Norman influence,[1] and of t the centre of France, seconded by the old national spirit of the Gallo-Roman people, that we owe our having remained French; for again in that epoch the English invasion was not regarded as a foreign invasion, for a a good portion of the territory of France.

Note 1. p. 66. Even in England, the Welsh are of the same race as the Bretons, and to this day do not consider themselves as English; for them the English are always Saxons or Normans.

If we are allowed this digression, this is not because we have the pretension of entering the domain of the historian, but because we need to establish certain classifications, a method for causing our readers to understand the feudal castle during the middle ages, to emphasize its importance, its transformations and varieties, the causes of its grandeur and its decadence. So much for the general political character, let us say, of the primitive feudal residence. Its special c character was related to the customs and private life of its inhabitants. Now let one conceive what must have been the life of the feudal noble during the 11 th and 12 th centuries in France! That is during the period of the development of feudalism. The Norman noble is constantly occupied with the affairs of his nation, the conquest of England, the national wars on the continent to which he is admitted only with regret, retaining for him a political part, that he plays, causing him to see an end not entirely personal. However restless, unsubdued and ambitious may be the Norman baron, he is compelled to enter into a common arena, to coalesce, to carry on great wars, to retain the habit of living in armies and camps. His castle has something of the territorial fortress, he has no leisure to shut himself within it long; finally he knows that to guard his domain he must defend the territory, for in England as in France, he is in the condition of a conqueror. The life of the French feudal noble is different; he is a possessor; the memory of conquest long since was effaced in him; he regards himself as independent, he only comprehends his duties as vassal because he benefits by the hierarchical system of feudalism, and that if he refuses to recognize his sovereign, he knows that on the morrow his own vassals will deny his pow-

after the external enclosure had been forced. We see the keep of the castles from the 11 th century generally placed near the wall of the enclosure, and having its special posterns, its sorties into the ditches, and commanding the side where access was easiest. However, we are inclined to believe that the feudal castle had only reached its perfection in defense after the Norman invasion, and that the people of the North were the first to apply a defensive system subject to certain principles, soon followed by the nobles of the continent, after they had recognized its superiority at their own expense.. The Norman defensive system was born from a deep feeling of suspicion and artifice foreign to the Frankish character. To base our opinion on material proofs, we must cause it to be o observed, that the castles from which there remain to us constructions between the 10 th and 12 th centuries, erected along the western coast, the Loire and its tributaries, the Gironde and the Seine, i.e., on the course of the Norman invasions or in the vicinity of their possessions, have a particular character, uniform, that is not found in the same epoch in the provinces of middle France, in the South and Burgundy.

We believe it unnecessary to emphasize the superiority of the warlike spirit of the Normans during the last part oo the Carlovingian period, over the spirit of the descendants of t the Frankish chiefs established on Gallo-Roman soil. As we h have previously stated, the latter were further dispersed and isolated, and they had no feeling of nationality, possessed by the Normans to a high degree. Feudalism assumed different characters on Frence soil, according to whether it was more or less mixed with the Norman spirit, and this remark if developed by a historian would shed light on certain portions of the political history of the middle ages, that appear obscure and inexplicable. Thus it is perhaps to that antinational spirit of a part of French feudalism, which could resist the N Norman influence, that we owe our not becoming English in the 15 th century. This is not a paradox, as might be supposed at the first glance. If all French soil had been impregnated by the national Norman spirit like Normandy, Maine, Anjou, Poitou, Saintonge and Guienne in the 15 th century, the English conquest would have been ensured forever. To this individual spirit and nowise national of the feudal lords of Brittany,

wooden structures, that we have restored in this figure, have long existed no more. As we have indicated, on the top of this mound rose the keep, the dwelling of the lord, only to be reached by a bridge of wood easily cut away. The enclosure contained the buildings necessary for lodging the companions of the lord, stables, sheds, stores of provisions, etc. Probably several gates opened in the palisades at the middle of the t three sides, perhaps in each one of these. These gates according to custom were equipped with external defenses like the Roman camp, with which this enclosure has more than one relation. Ordinarily an area was outlined by rough stones set in a circle in the ground of the court, indicating the place of assembly. Frequently in the vicinity of these residences are found tumuluses, that are nothing but a mass of earth covering the bones of warriors remarkable for their courage. These mounds could serve at need as advanced works. A watch-tower placed on the top of the keep allowed the observation of whatever occurred in the vicinity.

Note 1. p.84. See in Notes d.l'ac.imp.de Bordeaux, the note of M. Leo Druyn on some castles of the middle ages.

If the Frankish castle was placed on a hill, a precipice, they profited then by the nature of the ground, and the upper terrace of the site gave the form of the enclosure. The keep rose either on the highest point to dominate the vicinity, or near the weakest place to strengthen it. In these structures from a remote epoch rubble is seen to replace timber, because of the ease with which it could be procured in a mountainous country. But it frequently occurred then that the site of the castle was not sufficiently extensive to contain all its numerous dependances; then along the slopes of the hill or at t the base of the precipice was built a primary enclosure of p palisades or of dry stones protected by ditches, in the middle of which were constructed barracks suitable to house the garrison, stores, stables, etc. This primary enclosure, that we find in nearly all castles of the middle ages, was designated by the name of lower court. In general thes lower enclosure was protected by the keep. Besides men then recognized that the keep placed in the centre of the enclosure,like the pretorium of the Roman camp, was a bad arrangement when applied to castles, because it could not allow the garrison to make sorties, to cast itself on the rear of the besiegers

castles, which were only camps protected by ditches, palisades and some structures of timber suitable to protect from storms the men and their booty. They could also profit by the numerous Gallo-Roman camps, that are even found today on the banks of the Manche and the Seine, to increase them by new ditches, internal works, and thus to take the first elements of fortification of the country. Yet the Normans, active, both enterprising and prudent, tenacious, endowed with consistency manifested in all their acts, very quickly understood the importance of castles for guarding the territories on which the successors of Charlemagne had been forced to allow them to settle; and from the middle of the 10 th century, they were no longer satisfied by these defenses of the country in earth and wood, but already erected on the course of the lower Seine, the Orne and the little rivers entering the Manche, residences of stone, built with care, formidable in that epoch, of which considerable fragments remain, especially remarkable by the intelligent choice of their site. Otherwise were then the castles of France; as we have stated, they adhered to both the Roman camp and the Roman villa. These were established either in t the plain or on the mountains, according as the Frankish proprietor possessed a level or mountainous territory. In the first case, the castle consisted of an enclosure of palisades surrounded by ditches, sometimes by steep earth walls forming an oval or rectangle. In the middle of the enclosure, the Frankish chief caused the heaping of earth taken from a wide ditch, and on this artificial hill or mound rose his principal defense, that later became the keep. One still finds in the centre of France, and especially in the West, traces of these primitive castles.

An establishment of this sort, the Tusque of S. Eulalie of Ambares,[1] gives us an entirety sufficiently complete of the general arrangement of this sort of castle defended particularly by earthworks. This establishment is bounded on three s sides; 1, by two streams A, B; a ditch C encloses the fourth side of the parallellogram, that is 492 ft. long by about 295 to 360 ft. At the middle of the parallellogram rises a mound 88.6 ft. in diameter, whose ditch varies in width from 33 to 49 ft. On one long side at E is an embankment about 7 ft. high and 33 ft. wide. It is unnecessary to state, that all the wo-

system of defense subject to a political idea. Besides when t the Normans presented themselves on a point of French territory, everywhere proceeding by force in the same manner, this was by occupying the coast, by ascending the rivers and streams in their long vessels, that they penetrated to the heart of the country. The rivers were the natural route of every Norman invasion; on their banks must they seek to maintain and fortify themselves. The islands, peninsulas, precipices commanding afar the course of the rivers, must be chosen at first as military poents; the similarity of locations must p produce uniformity of means of defense.

In possessing themselves of Gaul, the Franks extended over a very vast and much varied territory in geographic respects; some remained in the plains, othersin the mountains, the former in the midst of countries intersected by streams, the better near great rivers; each must fortify himself according to the place and his personal intelligence; they ceased (except those near the Rhine) all communication with the mother country, and as we have already said, soon found themselves isolated and strangers to each other; political ties, that might again reunite them, were daily relaxed and the ideas of nationalism, of connections between the great proprietors of a S State, could have no influence on the successors of these chiefs of bands dispersed over the soil. On the contrary the Normans were necessarily moved by other motives; all pirates and connected, long continuing relations with the mother country, that continually sent them new reinforcements, arriving as conquerors in countries already occupied by warlike races, th they were bound by community of interests, by the need of keeping together, united, in these provinces into the midst of which they penetrated without daring much to extend far from the rivers, their only way of communication or of safety in c case of disaster.

That Roman influences exerted an influence on the arrangement of the dwellings of Frankish proprietors, they must be much weakened before the Scandinavian pirates, who commenced to f found permanent establishments on the continent only in the 10 th century. The latter were more accustomed to build boats than to erect structures on land, and must necessarily profit by the nature of the ground to establish their first strong

on the northeast extremity of the peninsula of Cotentin, near the island of Aurigny. "An intrenchment or ditch 1 1/2 leagues in length separates this promontory from the continent, this is the Haguedike.[2] It may be that the Haguedike or ditch of the Hague precedes the Norman epoch; but the pirates could u utilize the ancient intrenchments of the promontory, and make of them a place of refuge."

Note 2.p.61. Exped.d.Nordands, by M. Depping. Book 4, Chap.3. Rech.s.l.Haguedike e.l.prim.estab.mil.d.Normands s.n.cotes. Mem.d.l.Soc.des Antiq.d.Norm. Year 1831-1833. By M. de Greville.

When in the 10 th century the Normans were definitely established on a part op the territory of France, they built fortified dwellings, and these residences retained a particular character, both political and feudal. The Norman castle at the beginning of the feudal period is distinguished from the French or Frankish castle, it is always connected with a system of territorial defense, while the French castle long retained i its Germanic origin; this is the dwelling of the chief of the band, isolated, defending its own domain against all, and not taking into account the general defense of the territory. To make us understood in a few words, the Frankish noble had no country, only a domain; while the Norman noble sought to defend both his domain and the territory conquered by his people. T This distinction should be made at first, for it has an influence, not only on the location of the feudal residences, but also on the system of defense adopted in each of these. In t the construction of Norman castles, there is a certain equality that is not found in French castles; the latter present extreme diversity; it is seen that the caprice of the noble, his particular ideas have influenced their construction, while Norman castles appear subjected to a principle of defense recognized as good, and adopted by all possessors of domains, following a national idea. When one takes into account the circumstances accompanying the definitive establishment of the Normans northeast of Paris, the immense interest these pirates tolerated on the soil of Normandy had in keeping open the courses of the rivers and streams for themselves and the reinforcements comiug to them from the North, closed to the Frankish people, possessors of the upper Seine and most of its tributaries, one conceives why the Normans were led to adopt a sys-

character like the Roman camp; they were rather intrenched c camps intended to shelter an army, rather than castles suitable for permanent habitation, and for gathering within their inclosure everything necessary for the life of a chief and his men.[1] We can only give the name of castle to the fortified residences built in the feudal period, i.e., from the 10 to the 16 th centuries. These habitations are most formidable because they rise in the countries in which Frankish rule retained more purely the traditions of its German origin, on the banks of the Rhine, Meuse, in Soissonais and Ile-de-France, on a portion of the course of the Loire and of the Saone.

Note 1.p.41. Gregory of Tours speaks of several castles besieged by the army of Theodoric."Then," says he, Book 3,"Ch "Chastel-Marlhac was besieged (in the Cantal, Department of Mauriac). It is surrounded, not by a wall, but by a precipice cut to a height of more than 100 ft. In the middle is a great pond, whose water is very good to drink; in another part are springs, so abundant that they form a rivulet of living water, which escapes through the gate of the place; its ramparts enclose such a great area, that the inhabitants cultivate the ground there and gather fruit in abundance." It is evident, that this establishment presents rather the charcater of a vast intrenched camp, than of a castle properly so-called.

During the Carlovingian period, the princely successors of Charlemagne had made some efforts to oppose the invasions of the Normans; they had on several occasions attempted to defend the courses of the rivers, but these works were enclosed in times of distress, built in haste, and must have been forts of earth and wood, rather than proper castles. The new barbarians from Norway no longer thought of founding permanent establishments in the countries, that they devastated; attracted only by the love of booty, they hastened to return into their vessels, as soon as they had pillaged a rich province. Yet they sometimes halted on a promontory, in some islands in the midst of rivers, to shelter the products of pillage under guard of a party of men composing the expedition; they fortified these places already defended by nature, but these were intrenched camps rather than castles. An establishment of this kind is found again on the coast of Normandy, Brittany or the West, so long ravaged by the Norman pirates; this is the Haguedike

power; the others (his companions) were always mere warriors; and the more the ideas of property were strengthened and extended in their minds; the more was developed inequality with all its effects. The king or the important chiefs, that had occupied a vast territory, distributed lands to their men to attach them to their service and reward them for services rendered. The warrior to whom his chief gave an estate dwelt on it; a new principle of isolation and of individuality. This warrior usually had some men of his own; he sought and found those that came to live with him in his domain; a new source of inequality."

Note 1.p.59. De Bell. Gall. Book 6. Chap. 23.

Note 2.p.59. De Mor. Germ. Chap. 15.

Note 3.p.59. Hist. d.l.Civil.en France, by M. Guizot. Less.8.

Note 4. The same. Lesson 8.

Thus this community dissolved at the moment when it established itself on the conquered soil after having dissolved the old Roman society, only forming the feudal regime; it had also brought the germs of this. But there were necessary four centuries of anarchy and of experiments, of attempts to return to the imperial administration and of struggles, to bring an organization out of that disorder.

What were the rural habitations of these new possessors of Gaul during that long extent of time; In that respect, one c can only conjecture, for information is lacking to us or is very vague. Everything leads us to suppose, that the Roman villa again served as a type for the rural structures erected by the conquerors. Gregory of Tours speaks of several of these dwellings, and what he says well corresponds to the arrangements of the villas. They were isolated buildings intended for farming, for storing the crops, lodging servants and colonists, in the midst of which rose the hall of the master, or even an enclosure in the open air, a hall within which the Frankish chief and his feudaries gathered; that enclosure under the o open sky or covered, served as a hall for feasts aud conucils; it was accompanied by porticos, vast stables, kitchens and b baths. The group formed by all these buildings was surrounded by an enclosing wall, a ditch or a simple palisade. Along frontiers on some elevated places the Merovingian kings had built fortresses; but these appear to have had a purely military c

their farm buildings under protection from sudden attack. The German spirit was quite different. "It is the honor of the t tribe," sans Cesar,[1] "to be surrounded only by vast deserts, to have devastated frontiers. The Germans regard it as a striking mark of valor to drive their enemies afar, to allow no person to establish himself near them. Besides, they find in this a means of securing themselves against sudden invasions." Tacitus states,[2] "that the Germans never dwell in cities; they cannot even allow their habitations to touch each other; they remain separated at a distance, according to whether a spring, plain or forest has attracted them to a certain place. They form villages, not like ours with edifices connected and adjoining; each surrounds his house by a void space." Of three Germanic peoples that invaded Gaul, Burgundians, Visigoths a and Franks, the last in the middle of the 6 th century alone ruled all Gaul, save a part of Languedoc and of Brittany; and of these three nations, the Franks were those that had best retained the customs of the Germans.[3] But gradually this people had abandoned its wandering habits; it was established on the soil; agricultural life had replaced the life of the camps, and yet it retained its primitive character, its love of isolation and its aversion to the civilized life of cities. One should not mistake what we here mean by isolation; it was not solitude, but the isolation of each band of warriors attached to a chief. This isolation had existed in Germany, among the peoples that threw themselves into the West, as proved by the texts that we shall cite. "When the tribe was transplanted to Gaulish soil," says M. Guizot, "the habitations were more dispersed; the chiefs of families established themselves at a mu much greater distance from the others; they occupied vast domains, their houses later became castles; the villages formed around them were peopled, not by free men and their equals, but by colonists attached to their lands. Thus in material r respects the tribe found itself dissolved by the sole fact of its new establishment. The assembly of free men, in which were treated all matters, became much more difficult to gather." The equality prevailing in the camps between the chief and h his companions must become lost, and indeed soon vanished, from the moment the German band was established on the soil." The chief had become a great proprietor and had many means of

13 th century. The latter is as sagacious in the entirety of its composition and as pure in execution, as that of S. Chapelle is barbarous in design and rude in execution.

In the course of this work, we have occasion to return frequently to works of carpentry. In this Art. we only indicate certain general principles, that make known the progressive advance of the art during three centuries; we refer our readers to Arts. Beffroi, Echafaud, Fleche, Hourd, Maison, Pan-de-Bois, Plafond, Plancher, Pont, etc.

CHATEAU. Castle. Chateau.

The castle of the middle ages is not the Roman castle; it would rather be the antique villa furnished with external defenses. When the barbarians took possession of the soil of G Gaul, the territory was divided among the conquering chiefs; but these new proprietors prought with them their German customs and soon changed the appearance of the conquered country; the Roman proprietor did not think of fortifying his villa, that was only a house for pleasure, surrounded by all the dependances necessary for the culture of the land, for food, and for keeping animals, for lodging tenants and slaves living on the soil nearly as our farmers and peasants. Whatever changes operate in the customs of a people, it always retains something of its origin; Roman citizens had cleased to devote themselves to agricultural occupations for a long time, when they established themselves on the soil of Gaul, but still retained in the centuries of decadence the cusmtos of landed proprietors; their villas were established in the midst of rich vallens, along streams of water, and were surrounded by everything necessary to country life and to great civilization. Quiet possessors of the greater part of Gaulish soil for three centuries, having to struggle neither against the people, submissive and become Romans, nor against the invasions of barbarians, they had not taken care to furnish their villas with defenses suitable for resisting an attack by armed men. When the irruption of barbarians from Germany commenced, the last possessors of Gallo-Roman soil abandoned the villas to shut themselves in the cities fortified in haste; the flood passed over, they repaired their devastated rural habitations; but either effeminacy or by force of habit, they rarely thought of placing t

The foresight that reserves in a long timber certain projections, that add to the strength of a joint, the choice of woods or their position according to the place they must occupy, t the care to not fix them in the masonry but to leave them free and ventilated, indicate in the masters a perfect knowledge of their art, of the qualities of materials, study and care; just as the simplicity and suitable proportions of connections indicate in mworkmen a continued habit of good work. The carpenter of the middle ages did not call to his aid the smith to connect, fasten and hold the timbers he employed, except in some particular and very rare cases; he was sufficient for himself and iron did not, as in modern carpentry, supplement the inefficiency or weakness of the connections.

The art of carpentry is one of those to which modern improvements have added little; dureng the 15 th century it reached its complete development. In that epoch timber was much employed in civil, public and private structures, and carpenters formed a powerful guild, instructed in the art of drawing, a and that long retained its ancient and good traditions. Indeed of the various branches of the art of construction, the art of carpentry yielded less than any other to the ideas given by the Renaissance, and during the course of the 16 th century, men followed the principles developed in the 15 th century, almost without modifications. One architect alone brought forth a very important change in the systems retained until then. Philibert de Lorme invented the method in carpentry, that has retained his name and permits covering considerable spans without the aid of tiebeams, without thrusts, and using a relatively small volume of timber. We do not need to develop here the system adopted by that artist; it is known to all and is still successfully practised in our days. We refer our readers to his work, so much to be recommended.

During the 17 th century the art of carpentry declined; the carpentry left to us by that epoch is often badly designed, heavy, and executed with inexcusable negligence, after such beautiful examples left by the preceding centuries. Before t the rebuilding of the carpentry of S. Chapello of Paris in r recent times, it was interesting to compare the framework of the spire replaced under Louis XIV after the fire, with the framework of the spire of Notre Dame, which dates from the

When houses presented their ends to the street, i.e., when the site occupied was much deeper than wide, the front framework terminated in a gable and not in a hip. This gable was only the primitive form of the roof, most frequently projecting beyond the plates, so as to form a kind of hood for protecting the facade from rain. These arrangements and those relating to the front half timber work being developed in Art. Maison, we refer our readers to this.

As for the carpentry of floors, they aee generally very simple during the middle ages; few or no complete ties, but beams are set regularly on the front or partition walls, and receive joists, that remained visible like the beams themselves.

Yet men already knew in the 15 th century how to truss timbers horizontally so as to prevent them from beiding under a load. The organ gallery of the cathedral of Amiens dates from that epoch, and rests on a beam trussed with much skill; that beam is about 49.2 ft. span and is heavily loaded. We give (39) another trussed beam of the great hall of the castle of Blain in Brittany, built at the end of the 14 th century by the constable Olivier de Clisson and repaired about 1475. This trussed beam consists of two horizontal members A and B. B is wider than A in order to form ledges to receive the joists of the floor. The truss consists of a curved timber framed into the ends of the beam B,and connected at the middle by two iron bolts held by keys.[1] We have also seen in secular structures, and among others in the old mansion de la Tremoille at Paris, erected in the last years of the 15 th century, trussed floor girders of about 39.4 ft. span as indicated in Fig. 40; the two timbers B B were set end to end and partly indented in the depth of the girder A receiving the joists, as indicated by the section at C. The timbers A and B are connected together by bolts with keys.

Note 1.p.57. This curious example was furnished to us by M. Alfred Rome.

One of the characteristics peculiar to the art of carpentry of the middle ages is its frank appearance, knowledge of woods and its respect for their properties, we may say. The combinations of the carpentry of the middle ages merits careful study; they are simple, well proportioned to the strength of t the timbers or for the particular purpose to be satisfied. T

the ends of the upper beams L are relieved by struts N framed into the large posts P.

Note 1. p.53. This house has recently been changed; we drew it in 1853, when it was nearly intact.

In mediaeval cities enclosed by walls, space was rare; so the houses occupied more length at each story at the expense of the public way; thus they presented a series of corbellings projecting sufficiently sometimes to make it possible to join hands from the upper stories of houses situated opposite each other. To obtain these corbellings, "ligneaux," the beams of the floors projected at each end beyond the lower half timber frame, their ends being supported by brackets, and the upper framework was erected flush with the ends of the beams.

Here (38) is explained this work in carpentry. This kind of construction in wood merits being studied. Let the posts of the ground story be A. The heads of these posts receive the braces B designed to assist the outer ends of the beams C. Plates D connected the ends of the beams C as indicated by t the mortise. Thise plates are relieved by small braces boxed and tenoned. A girt L is framed into the heads of the posts A and is itself relieved by braces F. This girt supports the j joists of the floor of the second story. Posts G stand on the ends of the braces C and overhang the posts A. The posts G receive the upper plates of the second story and the beams K, whose projecting ends are relieved by curved brackets. On the ends of these beams are placed the plates below the third story, and so on for each story up to the roof. The joists of the floor of the third story rest on the upper plate H, project beyond it and aid in relieving the girt I. Diagonal braces arranged in the framework transfer the loads of the framework and its panels in plaster or bricks to the ends of the main beams. These beams being held in the framework or the internal wall tie the entire system and prevent its overturn. It is easy to see that one thus gains from the public street in each story one, two or three feet, that benefits the rooms intended for habitation. These successive corbellings also form shelters, that protect the framework, the fronts of the shops and passers from rain. They only have the inconvenience of making the narrow streets very dark; but it does not appear, that in mediaeval cities they had the same ideas about this as ourselves.

a single piece.

The art of carpentry was not limited to erecting roofs over vaults or to visible carpentry. From all time in France men had built houses and even palaces and churches of wood. We s still find some traces of houses of the 13 th century built in this manner, particularly in the North; But these structures, rebuilt, do not give us examples sufficiently complete,. to make it possible for us to render an account of the means of construction employed. It is necessary for us to commence our examination in the 14 th century; only in that epoch shall we find entire half timber work forming the facades of houses on the public street.

On a ground story composed of solid walls, of a series of arches or of isolated piers, the carpenters as in our days placed a sill, that received the half timber frace of the front. One could still see three years since (1850) opposite the south side of the choir of the cathedral of Chartres a s small wooden house of the 14 th century,[1] whose half timber front was very graceful in form; it was one of the most complete and most elegant, that we know from that epoch. On a basement built of solid masonry and reinforced by vertical quoins are set beams A supporting the floor of the next story, (37), (beams passing through the wall and appearing on the e exterior). The ends of these beams receive the sill B. On the sill stand the main costs P above the horizontal beams A; then in the interval between beams are set other posts C, kept vertical by walls D with X-braces. These posts C are framed at t top into a girt F, which is itself tenoned into the main posts E. Braces G carved in pointed arches with cusps form a series of windows lightiug the interior. The girts F support two struts H above the posts C, that recieve the plate intended to receive the carpentry of the roof. But this plate is doubled, according to custom, as indicated by the section K. The outer plate I supports only the furring of the roof and is set on the ends of the beams L connected with the heads of the main posts P. These beams I serve as tiebeams for the roof trusses and support the joists of the upper floor. The inner plate M, that cannot bend because it is supported by the struts, receives the feet of the rafters. The parapets and intervals between the posts are filled by thin masonry. One will note that

and (36 ter) next the kingpost. Fig. 36 shows how the curves or ribs A under the principals of the two principal trusses relieve the girts D and are connected with these principals and struts by means of small doubled ties held by the key F; how the rafters are equally held by ties, that join them to the curves; how the bending of these rafters is prevented by the struts G joining the girts H; how the cross-bars I, detailed in I', I" and I‴, fit between the rafters and receive t the heads of the false rafters K, so as to make the setting possible. Fig. 36 ter shows how the ribs L under the rafters, not being able to join the struts G, connect with a second girt M.

Finally Fig. 36 quater shows how the principals of the two trusses join the kingpost at the apex of the roof; how the en ends of the rafters E are tapered, rest against and join the little curved girts O. The horizontal section R at the level Y, and the two sketches S S' indicate how these little curved girts are held between the principals.

Conical works in carpentry present very great difficulties in assembling, for it is necessary in erecting for the tenons to enter their mortises; now all the timbers tending toward an axis, it is necessary for the carpenter to foresee on the yard the practical means, that will permit him to first assemble the principal members, then the secondary ones, without its being necessary to recut the tenons, and even sometimes to omit them entirely, so that the members can take their places. Thus in the present example, the curved plates being set, the two trusses at right angles are raised and fasteued together, then the struts, rafters, their girts and braces, f finally the headers and false rafters. All the last members are set without difficulty from the outside without its being necessary to raise the main trusses to enter the tenons of t the secondary members in their mortises. Conical carpentry g gives the measure of the experience of the carpenters of the 14 th and 15 th centuries; they are always, not only well combined and well jointed, but even the means of assembling them are foreseen with rare skill, so as to avoid difficulties in erecting. Frequently this conical carpentrn has no ties at t the base; the circular plates being strongly connected by keys alone prevent the spreading of the rafters, like a circle of

the weight of the entire system to the four piers of the transepts. From the beginning of the 13 th century, carpenters k knew how to erect in an ingenious fashion these enormous masses of timbers and to suspend them above the trusses from hips, without loading the transverse arches extending from one pier to another. We shall have occasion to occupy ourselves with this carpentry in Art. Fleche, to which we refer our readers.

As for the conical carpentry covering cylindrical towers, it is devised from the system adopted for the carpentry of c circular hip roofs. The middle ages having erected a considerable number of towers, either in castles or to protect the walls of cities, the carpentry of these works serving for defense and for habitation is found today in great number; in palaces themselves some exist in the enclosure of the palace, which are very beautiful and well preserved. It will suffice to give a single example summarizing the ordinary combinations of this carpentry, to cause to be understood what they particularly present.

Let there be the plan of a round tower (35) and its outline (36). The quarter A of the plan (Fig. 35) presents the lower radial mem ers at the level A of the plates(Fig. 36); the quarter B has the second radials, the quarter C the third radials, and the quarter D is the horizontal projection at the level D. Two tiebeams E F, G H (Fig. 35) at right angles, rest on the double circular plates. Two trusses intersecting at right angles and connected by a central kingpost I give the outline K. (Fig. 36). Each quadrant supports six rafters, whose prolonged blocks form the radials L (Fig. 35) by joining the large girt M. The outline of these rafters is given at N (36). Between each of these are set between the first and second radials A and B false refters outlined at O, to support the battens between the rafters, which are widely spaced in the lower part of the cone. These false rafters rest on ordinary blocks, as may be seen in the quarter plan A. The six rafters per quadrant are single timbers from P to R and end in taper bevels at their heads, as we shall soon see. The two trusses at right angles have at the height B curved girts, that receive the b braces and ties of the lower radials and form the second radials. But these second radials merit all our attention. We give a perspective detail of it (36 bis) near the perimeter,

connected with the lower end of the kingpost D, the principal E, themselves curved at their junction with the kingpost, so as to make the firm connection indicated in the detail M. The curve and the principal are held together at the tangent point by two small blocks of wood F, whose detail N explains the f form and connection. Under the principals are pinned and halved two rows of purlins G, which are connected by X-br.ces i inclined in the slope of the roof,and reproduced at I in the longitudinal section. These purlins relieve the rafters outlined at P, but have as principal purpose to prevent overturning of the carpentry. The rafters are also furnished with c curves under which are nailed boards, as shown at H. The subridge K and the girts L are connected by X-braces, that keep the kingposts vertical.

This carpentry, in spite of the care taken at the connections, has spread, and as we said before, some years after its construction it was necessary to restrict its span by tiebeams placed at alternate trusses; it appears to date from the last years of the 15 th century.

We give (34 ter) the detail of the plates, the blocks, the large and small cover-joints on boards at a scale of 1/20 full size. One will note (34 bis), that the curves of the rafters join the collar beams, which themselves join the girts R extending from one kingpost to another. That is scarcely well; but they trusted with sufficient reason to the boards to maintain the light curves of the rafters, these boards forming a vault, that itself offered considerable resistance. Between the rafters, spaced about 1.8 ft. on centres, strips are placed under the battens intended to give greater strength.[1]

Note 1.p.47. We owe the drawings of this carpentry to M. B Bruyere, architect, who drew it with care and was willing to communicate his notes to us.

The principal hall of the city hall of S. Quentin permits us to still see carpentry without tiebeams, from the beginning of the 16 th centurw, whose arrangement recalls that of the church of Hargnies.

Since the 12 th century men have built, either on the towers or over the centre of the crossings of churches, tall spires of wood covered by slates or lead. These spires required, and especially the latter, very wise combinations to transfer

supported by the braces P resting on the extrados of the great doubled curve; indeed this lower row of purlins must support not only the rafters, but also the roofs of the dormers R; it certainly would have bent inward if it were not supported by the braces. There are 11 rafters between the trusses.

Note 1. p. 43. Rocking is the movement that wind pressure produces in trusses and rafters.

To afford an idea of the beauty of execution of this unique work of carpentry, we draw (34) a detail of its lower portion. The ends of the great blocks, that receive the feet of the posts D are ornamented by figures of angels holding the quartered arms of France and England, the Whole carved in the solid wood. The wings alone of the angels are added. At S we give the section of the two curves taken at J T; at V is the section of a mullion of the open filling, and at X is the section of the block at Z Y. As far as one may judge without separating the carpentry, the connections, tenons and sections are executed with rare accuracy; thanks to that purity of execution, and still more to the quality of the wood employed, as weel as to the goodness of the system, the carpentry of the grea hall of Westminster has been preserved intact until our days.

At the end of the 14 th century and the beginning of the 15 th, England was victorious, rich and flourishing; France on the contrary was ruined by disastrous invasions and the quarrels of the great vassals of the crown; so that we have nothing in that epoch, which could be compared to the great hall of the abbey of Westminster for lukury of construction. The carpentry works remainiug from that time are simple and differ little from those before given in Figs. 19, 21, 23, 26 and 28, for they generally cover only halls of moderate width. If Normandy and Picardy possessed carpentry roofs erected according to the Anglo-Norman system, which is possible, they have not remained till our days. Yet we find near Maubeuge in the little church of Hargnies carpentry, whose combination is connected with both systems of Anglo-Norman and French. That carpentry was without tiebeams, for about the middle of the 16 th century ties were placed below the principals at every other truss. The main trusses, whose outline is given at A (34 bis), rest on strong blocks B; they consist of two curves C connect-

fear any dislocation for the entire length of the kingpost; hence the two half trusses form two rigid triangles, solid and having a common base. Indeed the collar beam A (Fig.32) is in a single piece; it is even set on edge and is deeper at the middle than at its ends. This tiebeam forming the base of the triangle with B C as one side cannot open; it is a complete truss, rendered still more rigid by the panels attached to it. This upper truss or homogemeous triangle rests on two posts D, whose feet join the end of the block E. The block i itself is kept horizontal by the curved brace F and the panels. But if the pressure were very great at the end of the block, this pressure would exert a thrust at G, at the base of the b brace F. To avoid this pressure and thrust are placed the great doubled curves H, that join the middle of the collar beam A, the post D, the block E and the foot of the brace F, stop all movememt, and make of these lower compartments a single and united work of carpentry, which is susceptible of neither deformation nor dislocation. Further, let us remark that all spaces between the principal members are filled by open tracery in wood, that stiffens the entire system and maintains t the curves in their purity. Thrust is exerted at the point G only if these curves deflect more under the load' the vertical filling formes as many ordinates, which by their vertical pressures prevent the curves from being deformed. Let us now examine how the rafters were placed between the main trusses, that are spaced 13.9 ft. on centres. The main trusses support purlins I according to the Anglo-Norman system; but these purlins have a sufficiently great span; they must support enormous r rafters and all the covering.

Here (33) is a perspective view of one bay, which will save us long explanations. On the head of the post D is placed the principal series O of the purlins, relieved by braces L and the open filling. Braces M connect the collar beam A and the purlin; they also aid in preventing overturning [1] the trusses and rafters. This principal row of purlins is crowned by a p plank forming a projection on which are fixed blocks intended to prevent the slipping of the rafters placed above the dormers. The other rows of purlins I are relieved by curved braces N in the plane of the rafters, and joined to the principals. It will be noted, that the lower row of purlins I'is further sup-

kept horizontal by the curved brace H, and the space behind it is filled with planks; thin braces stand on a post I made in form of a little column and on a corbel K fixed in the wall. A cornice with wooden frieze is ornamented by half length figures of angels holding escutcheons, and conceals the plates and the top of the wall. It is unnecessary to state, that this carpentry was decorated by paintings. The stability of this carpentry chiefly consists in the size of the timbers employed and in the extreme sharpness of the two curves transferring a great part of the thrust to the little post I, i.e., against the top of the wall. This system being adopted led Anglo-Norman carpenters to very skilful combinations and great boldnesss of execution.

All who have been in London have seen the carpentry, that covers the great hall of the abbey of Westminster, whose clear width is 68.9 ft. There is a magnificent example of thise immense wooden structures, that are found so frequently in the North of France, and which are still met with in England. It merits an accurate description for our readers. The walls of the great hall of the abbey of Westminster are 7.2 ft. thick for a height of about 37.6 ft. The carpentry from the top of the walls to the ridge is 45.9 ft. and nearly 65.6 ft from t the corbels to the ridge. The principals and rafters are 55.8 ft. long including tenons; we could not learn whether they a are each of a single piece. The different members of this carpentry are covered by beautiful mouldings, all cut in the solid, and the joints are executed with such perfection, as to be recognized with great difficulty.

We give first (32) half of one of the main trusses. The principle, whose elements we have indicated in the carpentry of the cathedral of Ely, is found again completely developed in the carpentry of Westminster. No tiebeams, but great projecting blocks supported by braces, and themselves supporting the curves, that join below the false kingpost. But at Westminster to connect the part of the carpentry above the blocks with the great angles supported by them, great doubled curves brace the entire system, making its different members stable, and giving to each half truss the rigidity and homogeneity of a plank. T The problem set in Fig. 30 is solved here, for it was easy to join the two half trusses to the false kingpost, so as not to

spreading of the two principals.

Note 1. p. 37. See the work of J. H. Parker. Some Account of Domestic Architecture in England from Edward I to Richard II. p. 242. Parsonage House, Market Deeping, Lincolnshire. Also Glossary of Terms used in Grecian, Roman, Italian and Gothic Architecture, by the same author. Oxford. Vol. 2.

The problem that the Anglo-Norman carpenters had to solve was this; to give two triangles A and B (30) a common base C D. This problem being solved, one could omit a tiebeam connecting the two angles E F.

One of the trusses of the great hall of the abbey of Malvern (Worcestershire), that dates from the middle of the 14 th century,[1] very clearly indicates this experiment of the Anglo-N Norman carpenters. Here is the perspective representation.(30 bis). This truss is actually only a sort of square composed of different large timbers whose combination forms only a rigid triangle. The timbers are deed but not thick, and are held together by strong boards let into their thickness. One will note how the purlins are relieved by the curved braces A, which have the advantage of supporting the rafters and preventing the overturning of the entire carpentry. It must be admitted that this system requires the use of enormous timbers compared with the result obtained; it was to pay dear for the o omission of the tiebeams. Yet this truss has but a very moderate span, and this method could not be applied to carpentry intended to cover wide naves. Thus we see it necessarily abandoned, when it is necessary to construct trusses of great dimensions.

Note 1. p.38. See in Glossary of Terms, etc. by J. H. Parker, a curious collection of English carpentry.

The nave and transepts of the cathedral of Ely are still covered by beautiful carpentry dating from the end of the 14 th century. We give (31) a truss of this carpentry with the b bay between two trusses. The great curve A B is in a single piece, it joins at its base the great block C, at its top the false kingpost n. The triangular spaces E F are filled by planks grooved into the principal and the extrados of the curve, so as to make the curve and principal stable. The purlins are set between the principal and its curve. The sub-ridge-piece G is relieved by the curved braces. As for the block, it is

since the 13 th century. Being unable to go back to principles, it is always well to know the derivatives, the more so as they are very remarkable and merit the attention of constructors. As we have stated at the beginning of this Art., it is by the great dimensions of the timbers employed, that the Anglo-Norman carpentry is first distinguished from that executed in F France during the 13 th, 14 th and 15 th centuries, then by combinations having striking relations to naval constructions, and finally by a rare perfection carried into the mode of joining the timbers. In the Anglo-Norman visible carpentry, the purlin plays an important part, and does not cease to be employed; only instead of being independent as with us and placed on the principal, it is intimately connected and forms with it a grillage, a sort of framework on which rest the rafters.

A very simple example will make this system understood.[1] (28). This truss without tiebeam at its base, is indeed found inserted between other timbers with them; it is not the result of chance, but of a system employed during the 13 th and 14 th centuries. The block A is carved at its visible end, and is held between two places B halved together with it; a strong curve D in one piece is fixed to the principal C by a long t tenon pinned twice. The lower purlin E is set between the curve and principal; it is frankly done, the curve and rafters being gained to allow it to pass. The upper purlin E' rests in a gain cut at the end of the collar beam F and in the principal. Thus the rafters have the depth indicated by the dotted line and are flush with the outer side of the principal. This truss has only 17.7 ft. span, and its principals cannot spread apart without deforming the curves, which is scarcely possible, and without breaking the tenons of the collar beam, which have great strength and are well pinned. But when these spans were greater, it would have been difficult to find curves in a single piece. The Anglo-Norman carpenters then used two, one above the other as indicated in Fig. 29, taking care to give their timbers great dimensions, so as to obtain very strong tenons. The weak point of these carpentry works was at their top. It was easy by combinations of curves and timbers of great dimensions, to give the principals perfect rigidity; what was difficult to prevent without the aid of tiebeams, was the dislocation of the combination at the top of the truss by

that they have not understood the function of that member, w which as everyone knows is only to prevent the spreading of the principals; the tiebeam should support nothing, but on t the contrary it needs to be supported from the kingpost at the middle of its span; for on its being properly level depends the stability of the truss. One still finds in England o carpentry from the 13 th century combined in such fashion, t that the tiebeam supports the kingpost (termed the royal post) and consequently the entire truss. In this case the tiebeam is an enormous timber set with its greatest depth. For a long time in French carpentry roofs were erected in which the function of the tiebeam was perfectly understood and applied, while on the other side of the Manche and probably in Normandy, men persisted in seeing in the tiebeam only a support. It would be difficult for us to discover the reasons for the ignorance of a simple principle known from all antiquity. Perhaps that only came from the facility with which in those countries was procured timbers of enormous dimensions and in all forms. Thus in a hall at Charney (Berkshire), whose carpentry dates back to 1270, we find a roof that almost wholly rests on a v very large girder, set its deepest way, and that in fact takes the place of a tiebeam at the same time,that it supports the entire system of the carpentry.

We give at A (27 bis) a main truss and at B the longitudinal section of this roof. It is composed only of a series of rafters furnished with collar beams R and braces. The collar beams rest on a strong plate F relieved by braces C transferring its load to a kingfost D, itself placed on the tiebeam or girder E.

One will understand that constructors, who so badly understood the function of the tiebeam sought to get rid of this m member. Thus we see from the 14 th century, that the Anglo-N Normans sought combinations in carpentry of roofs in which t the tiebeam is suppressed. These combinations must be understood by us, for they were certainly employed in the middle ages in Normandy and the North of France, and the carpentry of the 14 th and 15 th centuries, that is still found in abundance in England, is derived from a Norman principle of construction, of which we find only rare traces among us, nearly all this carpentry having been replaced successively by vaults

crossed braces M, notched one-third on the outside of the rafters according to their slope. Particularly these long crossed braces in the plane of the rafters maintain the carpentry in place. Furrings placed on the rafters fill the projection of the long crossed beams on the inclined plane of the rafters and receive the battens and slates. The rafters are spaced 2.1 ft. on centres, and the battens are consequently quite thick, of split oak. The heads of the rafters are halved together a and do not rest on a sub-ridge-piece. This hall was lighted by dormers between two horizontal pieces between the rafters, reproduced at N in the longitudinal section, and by openings made in one of the gable walls of masonry. The rafters, struts and curved beams are only 7.8 × 6.3 ins. set flat, and so are the other timbers in proportion; it seems that then the carpenters sought to distribute uniformly the weight of the roof carpentry on the tops of the walls, and to reduce it as much as possible. Further, all these timbers are simple logs and not sawn, hewn with the axe with great care, and with the sap well removed. (Art. Bois). That explains their perfect preservation for five or six centuries. It is unnecessary to say, that this carpentry is ceiled internally by boards nailed in the curves with battens. These boards are generally decorated by painting, such as may still be seen in the great hall of t the ducal palace of Dijon, in the church of S. Madelaine of Chateaudun, etc. (Art. Peinture).

The carpentry of the great hall of the castle of Sully has no tiebeams, properly speaking, just as it has no principals. This is an exceptional arrangement in France, or at least is only found in particular cases as here. But it is necessary to state that the rafters closely approach the vertical, that it is very light, and finally that the struts fastened on the plate set above the floor are strong and resist the thrust of the rafters by their curvature. The tiebeams of this carpentry are in fact only the enormous girders of the floor, that prevent the spread of the walls.

But if we desire to see visible carpentry, whose span is m maintained without tiebeams, and by means of a system of connections different from those just examined, it is necessary to go into England. When by exception the English have furnished the trusses of their carpentry with tiebeams, it seems

the interior of that hall. Bibl. Imp. d.Estampes. Coll. Collet.

Note 2. p. 32. The tiebeams of the last carpentry, which d dates from the beginning of the 16 th century, have been cut away; yet it is still preserved in spite of that serious mutilation.

Among these remains of the art of carpentry of the middle ages, the most interesting, oldest and most complete, is the carpentry of the great hall of the castle of Sully-on-Loire, which dates from the end of the 14 th century. The great hall of the castle of Sully is situated in the fourth story at 46.9 ft. above the ground of the court; it is entirely a system of construction in wood, admirably understood, that crowns a long and wide fortified structure, defended by machicolations with a gallery around it, the external side looking on the Loire and the side of the court.

We give first the (26) transverse section of that carpentry. The girders supporting the floor beams of the hall are 24.8 ins. deep by 19.7 ins. wide and have a span of 39.0 ft. These girders are relieved by stone corbels B. On the side next the court other corbels receive the first plate C, that on the o outer side is set on the top of the wall, this plate being 11.8 ins. deep by 9.5 ins. wide. A second row of plates D of the same dimensions receives the struts E, that are curved at their ends to join the rafters. From the level of the floor to the top of the pointed arch formed by the internal ceiling is 33.5 ft. Above the last floor the wall is reduced to a thickness of 3.1 ft. and rises to a height of 6.6 ft., then receives two plates and serves to separate the great hall from the external gallery furnished with machicolations and slots. The galleries are closed on the exterior by a stone parapet 10.2 ins. thick, and are covered by large beams G stiffened by little struts that curve inside like the feet of the timbers, so as to form a little pointed vault over this gallery. (See detail X). One will note that the blocks P are composed of doubled timbers fixed to the struts and the feet of the r rafters entering the outer plate R.

There are no main trusses here; the carpentry consists of a series of trussed supporting rafters without kingposts; but the entire system is made stable (Fig. 27) by two collar beams K stiffened by a succession of X-braces L (27), and by great

give one of the main trusses of that carpentry, at A and at B one of the rafters. These are only stiffened by two diagonals C C and the ribs D. Here the pointed timber ceiling is composed of two arcs of circles with centres on opposite sides of the kingpost.

Note 1. p. 29. This carpentry has been drawn with the greatest care by M. Alaux, architect at Bordeaux, who was willing to send us his sketch. This work dates from the end of the 13 th century.

It was in the great halls of the castles, abbeys, episcopal palaces and public edifices, that the carpenters of the middle ages were especially called to display all the resources of their art. Each feudal residence enclosed a vast covered area, that served as a hall for gathering at the solemnities, when the lord exercised his rights of justice, when he convened his vassals, either for festivals or to take part in his acts as a military chief. In time of siege, the great hall of the castle also served as a lodging for an increase to the garrison; in time of peace it was also a promenade, like our waiting halls added to modern palaces of justice. Generally these great halls were situated in the second or even the third story, the ground story serving as a storehouse, stable, refectory, and for storage of arms. Beiug only covered by a roof, and the walls of the castle not being strengthened by buttresses, which would have interfered with the defense, these halls were not vaulted, but had magnificent carpentry roofs ceiled internally, forming a safe shelter against the storms in the atmosphere.

The palace on the island at Paris had its great hall covered by a double pointed tunnel with ceiling resting on a row of piers connected by arches.[1] The castles of Montargis, Coucy, Pierrefonds, etc., possessed vast halls covered by visible c carpentry.(Art. Chateau). Unfortunately all these carpentry works are now destroyed, and those which exist still only belong to castles of the second rank. Yet we shall except the palace of the counts of Poitiers,(present palace of justice of Poitiers), that has retained its beautiful carpentry of t the great hall, which dates from the beginning of the 15 th century, the archbishop's palace of Rheims, and the palace of justice at Rouen.[2]

Note 1. p. 32. See the engraving of Du Cerceau representing

kingposts. We give (21) this example.

At A is the main truss, at B one of the trussed separating rafters, and at C is the longitudinal section of the carpentry. As always, boards of oak with battens over the joints were nailed on the curves of the trusses and rafters. These boards or strips of split oak are ordinarily 3/8 in. thick and even sometimes less. Those of the great carpentry roof are not more (Fig. 19); they are tongued as indicated in Fig. 22, to prevent the wind passing under the tiles from penetrating the interior. But the visible tunnel ceiling of this kind of carpentry did not always take the semicircular form; sometimes it is only a segment of a circle and more frequently is p pointed.

Such is the visible carpentry of the church of Mauvisin near Marmande,[1] that we give (23). We select this from many others, because of the particular arrangement of the plates, that are set on the tiebeam instead of being beneath, and blocks C that join the curve D terminating in a pendant, as shown in Fig. 24. The rafters E being themselves fastened to the ends of the blocks pass outside the outer edge of the wall,and take the place of corbels usually intended to support the gutter of the roof, when it has no passage, as in the present case. In this Fig. 24 we have indicated the tiebeam at F. Without its principal and its strut. The carpentry of the church of Mauvesin possesses an actual ridge-piece at A, Fig. 23, to which are fastened the ends of the rafters and not a sub-ridge-piece, as in most of the preceding carpentry. The overthrow of the roof is prevented by braces fixed at B in the kingpost, collar beams and ridge-piece. The rafters between the trusses,spaced 14.1 ft. between centres have each a collar beam, braces and curved ribs like the main trusses; they differ from those only by the absence of the kingpost and the tiebeam. This carpentry, that covers a nave 23.0 ft. wide, is very simple and stable; the ribs are bare today, but formerly received boards with battens, like those of Fig. 19.

Yet the carpenters of the 13 th and 14 th centuries erected visible carpentry still more simple than those given above, to cover naves with a width of 23.0 to 26.3 ft. There still exists one over the nave of the little church of S. Jean of C Chalons-sur-Marne, recommended by its extreme lightness. We

Note 1. p. 26. This carpentry is now concealed by ceilings and by internal portitions. Yet it is in place and has retain- its ceiling nearly everywhere.

At A (19) we present one of the trusses; between the tiebeam B and the collar beam D are visible a series of curves C skilfully connected, which are intended to receive the boards or strips of oak forming a slightly stilted semicircular timber vault, at I is the kingpost that passes through the vault at each truss and suspends the tiebeam. The longitudinal section E shows a truss at F and a series of trussed supporting r ribs G. All these ribs have each a collar beam with curves a just like those of the main truss at Ca The split wooden strips are nailed on each curve of the ribs and trusses, as shown in H, and the batten mouldings cover the joints and also strengthen the ribs inside, at the same time serving for decoration. Great X-braces fastened to the kingposts, the ridge-piece K and the collar beams L, prevent the movement of the entire carpentry and the overturning of the trusses. We give at M a detail of the capital of the kingpost, where it becomes visible below the vault. This carpentry is both light and stable, and it is easy to see, that in the work is only the quantity of timber absolutely necessary for its stability. The dimensions are reduced to their least area. In the part visible, t the kingpost has an octagonal section only 5 ins. diameter; the principals are only 5.5 × 4.7 ins., the ribs are but 5.0 × 4.7 ins. But the manner in which the trussed supporting ribs are made stiff particularly merits the attention of constructors.

Fig. 20 represents one of them. Set on blocks, the feet of the rafters are strengthened by curved ribs N; a collar beam O connects them,and two diagonals P P are connected by halving to the collar beam, and stay the rafters above the timber vault at R R, at the same time that they prevent the triangle from being deformed by the effect of wind, or a load heavier on one side than the other. In the longitudinal section E, o one sees at S the junction of the diagonals with the rafters, and how that junction does not interfere with the passage of the great longitudinal X-braces. This hall was no more than 15.7 ft. uide; like the great one it was covered by a semicircular tunnel ceiling in carpentry with visible tiebeams and

the splendor of that upper ceiling all covered with light blue and with white and rose tints on the gold grounds.(Art. Peinture).

Note 1. p. 23. This carpentry is of resinous wood with very fine grain, perhaps of larch. That of S. Paul-w-t-W. at Rome was of cedar.

Note 1. p. 24. Even in the provinces of the North of France, the Roman tiles were frequently in use until about the beginning of the 12 th century. We have found the proof not only in the reliefs, but on the vaults and in the ruins, that surround the edifices of the Romanesque epoch. Then the roofs were generally flat up to the middle of that century. Yet there are a good number of Romanesque gable roofs in the North, that have too great a slope for the Roman tiles to be used; in that case may be employed large flat tiles. (Art. Tuile).

About the middle of the 12 th century, the architects rejected that system of carpentry; they felt the necessity of emoloying smaller timbers, therefore more easily obtained, and l lighter; using lesser timbers, it was necessary to give the principals greater inclination, that they might not bend under the weight of the covering, and in great carpentry structures to suspend the tiebeams at the middle of their spans. Except in the southern provinces, where the carpentry retained a small inclination, everywhere in France and England at the end of the 12 th century was modified the system of visible carpentry, as had been changed the system of construction of masonry; the ceilings and sheathed rafters were replaced by semicircular or poented tunnel ceilings, allowing the tiebeams to cross at their bases, and comprised within the height of the roof. This system was very economical, because it avoided the construction of vaults in masonry, the buttresses necessary to a abut them, and it did not lose all the included space, comprised in vaulted edifices between these vaults and the ridge of the roof.

A few examples will suffice to cause to be understood the s system of visible carpentry adopted at the origin of pointed architecture, and that ceased to be used only at the end of the 16 th century. We shall select one of the best combined and lightast, which dates from the middle of the 13 th century; this is the carpentry of the great hall of the old episcopal palace of Auxerre, today used by the prefect.[1]

together enclosed by four boards nailed together, receiving double battens and tiles. A figure is necessary to cause this very simple system to be understood (17). The tiebeams have a span of 46.9 ft.; on account of their enormous dimensions (31.5 × 17.7 ins) they have not sensibly deflected. They are relieved in span by corbels. The principals are halved together and pinned at top, and are maintained in their plane by the weight of the little ceiling C suspended by double hanging timbers. So as to avoid the depth of purlins and rafters, which would have required a great thickness of the wall, as we proved at the beginning of this Art., the carpenters have omitted the purlins, and have set the rafters (purlins ?) across the principals, as our Fig. 17 shows at A in perspective and at B , the geometrical drawing of a truss with the rafters and the ceiling beneath the ridge. Hence these rafters or rather a series of small purlins, no longer had to receive battens length wise. But to prevent cracks that the wind could not fail to cause under the tiles between these battens, they were doubled as indicated in Fig. 18, the lower ones being perforated by stars between each two purlins; however in spite of this perforation that bacame a pretty motive in decoration, all j joints were covered, and the air could not penetrate to the interior. The external battens placed transversely received the tiles, today hollow, very probably Roman formerly.[1] The cross battens are necessary to prevent the slip of the tiles, that would easily have occurred with the grain of the wood extending down the slope. This carpentry, so simple in its combinations, is decorated in the most splendid manner by painting and gilding. The little ceiling below the ridge is composed of two rows of star coffers and is hollowed out in the form of little domes, penetrating the spaces of the frame C, Fig. 17. A sort of paste or mastic covers that ceiling and is detached from the ground, with slightly projecting leaves and honeysuckle ornaments. This part of the carpentry is particularly rich in gilding and in magnificent painted ornaments, so that on entering the cathedral of Messina, one is at first struck by that line of coffers arranged along the axis of the edifice, and which led the eye to the rich mosaic in the apse, that formerly existed over the sanctuary. The principals and rafters have received darker tones, as if to emphasize more

idea of vaulting great halls and the naves of churches; but r resources did not always permit them to adopt this method, that required either strong buttresses on the exterior, or f flying buttresses intended to transfer the thrusts of these vaults outside the side aisles. When architects could not vault the great naves in stone, ruuble or bricks, they still s sought to give their carpentry the appearance of a tunnel vault; and in this carpentry, part of which was visible from w within, the constructors displayed all the resources of their art. We know of no great visible carpentry preceding the 13 th century; it is probable that those existing before that e epoch in the North of France, recalled to a certain point the carpentry of the primitive basilicas of the middle ages, which allowed the tiebeams to be seen and were only ceiled below t the ridge, as for example the carpentry of the nave of the c cathedral of Messina, so richly decorated by paintings in the interior. It should further not be forgotten, that this carpentry of the cathedral of Messina was erected during the rule of the Normans in Sicily, and that if in its painted decoration one feels a very evident influence of the art of the Moors, it is no less the work of the conquering Christians; that symbolical figures and sacred subjects abound there. There is e every reason to believe that the carpentry visible in the interior, which covers the vast naves of the churches of S. Remy of Rheims, of the Trinite and of S. Etienne of Caen, and of the cathedral of Peterborough in England among others, had m many relations with the carpentry of the cathedral of Messina, for the system adopted, the inclination of the principals and the interior decoration. Without entering the field of conjecture, but based on that example of the carpentry of the cathedral of Messina,[1] perhaps unique, we can indicate some prominent points, that will cause to be understood how the Norman carpentry approaches the carpentry of the primitive basilica, and in what they differ. The carpentry of the cathedral of M Messina only consists of a series of trusses not far apart, 3.2 ft. on centres, composed of tiebeams placed flat and of large dimensions, of two principals without kingpost but having a small ceiling of extreme richness below the ridge-piece. The inclined ceiling between that and the top of the wall or foot of the principal is composed of a series of purlins close

held by the doubled collar beam D. The lower brace A is perfectly held by the strut F. Above the connection of that strut and the brace, double suspension timbers are held by a wooden key, and these suspend the tiebeam in its span between the p plates and the kingpost. Large braces connected at H with the braces prevent the purlins from bending between the trusses, so that the rafters shown at K are entirely free and are only connected by collar beams I resting on the beam I, kept rigid like the sub-ridge-piece by longitudinal X-braces, as in Fig. 14. The system of struts F and of suspension timbers G gives great stability to the base of this carpentry, for the stresses and loads neutralize each other to the point, that the more the load acts, the more the tiebeam and principals are stiffened.

Here (15 bis) is a perspective detail of the connection of the braces with the lower line of purlins. At M is represented the strut; at N is the principal with its block O designed to support the purlin R; at S is the brace with its two large braces T T', the brace T' is assumed to be broken away to show the head of the suspension timbers with their wooden key above the connection of the strut with the brace; at V are the rafters. We meet with a sufficiently great number of carpentry roofs from the end of the 15 th and beginning of the 16 th c centuries drawn and framed on this system, that is excellent and only requires little timbers for the work. The carpentry of the cathedral of Amiens among others, rebuilt at the beginning of the 16 th centurw, has purlins thus kept rigid by means of braces against the struts perpendicular to the principals. Sometimes, in very large carpentry works, the braces r receive not only the braces that keep the purlins stiff, but also struts and ties, that relieve the architecture as indicated in Fig. 16.

One will notice that this system of braces fixed to the purlins again has the advantage of preventing the weakening of t the trusses and of all the rafters.

The system of carpentry covering the vaults, whose successive development we have just indicated, is followed in the visible carpentry, but with certain modifications required by the interior decoration. We have already stated that the architects were strongly preoccupied from the 12 th century by the

altitude; the principals and rafters have one of 55.8 ft. The longitudinal section is ade through the axis of the kingpost; that at D is made on the dotted line A B; the transverse section is made between two rows of purlins supported by a strut G set beneath the principal and connected to the tiebeam and the head of a post H. This post is suspended by the doubled sub-principals I, and itself suspends the tie at K by by means of two doubled hanging ties and wooden keys, as indicated in the longitudinal section D. It receives at its top two tie-beams L M, that prevent the overthrow of the intermediate part of the carpentry by means of ties and X-braces. In the upper part the flexure of the rafters is only prevented by the struts N and the collar beams O. As for the principals of the truss, they are made rigid by two collar beams P R, struts S and braces T. A sub-rideg-piece U, conected to the heads of the great kingposts, serves as support for the upper ends of the rafters halved together. A second sub-ridge-piece V and X-braces retain the tops of the trusses in their vertical planes. The great kingposts suspend the tiebeams at the middle of their spans by means of long doubled suspending timbers, held together by several wooden keys. In all this carpentry one sees no iron; with regard to its great dimensions, it is very light, and the timbers employed are of superior quality, perfectln squared and joined. All its strength consists in t the doubled sub-principals I, that are in single timbers not less than 47.6 ft. long. Dimensions do not exceed 8.7 ins. s square for the longest timbers, or 8 ins. of the old measure. It is evident in the carpentry of the cathedral of Rheims, t that purlins are already employed, not set on the principals, but below them; the external face of the principal is always in the external plane of the rafters. Always at Rheims, were it not for the small distance between trusses, the purlins might bend in their spans under the weight of the rafters. In other carpentry dating from the same epoch, the bending of t the purlins is foreseen and skilfully prevented.

Let (15) be a main truss; the bending of the principal is prevented; 1, by the collar beam C; 2, by the braces A A', t that join purlins B B in two bays; the brace A' perpendicular to the principal cannot slip; 1, because it is held in place by the block E placed beneath the principal; 2, because it is

The weight of these suspending timbers by loading the braces K exerts a thrust at L, that opposes the bending of the principal at that point. One peculiarity of this carpentry is, that the feet of the rafters and their struts do not join the blocks according to the ordinary custom, but the double plates placed on the shoes, that receive the ends of the tiebeams a and are pinned to the former. Fig. 13 gives at N the detail of the connection of the rafters and struts with the double plates, at P the details of the doubled suspending timbers F, and at O the means of suspension of the tiebeam to the kingpost. We shall note that iron is already employed in this carpentry at R and S to fasten the suspending timbers. These are pins with square heads.

The carpentry of the church of S. Ouen at Rouen is executed with great care' the timbers are perfectly squared, chamfered at the angles; the great double suspending timbers, whose details are shown at P (Fig. 13) are hollowed out, because these timbers only act as ties, and it was not necessary to leave to them their entire strength between the keys. We find at S. Germer a carpentry roof placed over the vaults of the chapel, at the end of the 13 th century, which has the greatest analogy to this, and that is likewise executed with rare perfection. But the difficulties were different and more serious, wh when it was necessary to erect carpentry over one of these n naves, for example such ar that of the cathedral of Rheims. Under the reign of Louis XI, a fire destroyed the entire covering of that edifice; it was rebuilt anew at about the end of the 15 th and the beginniug of the 16 th centuries. Then the art of carpentry had reached its climax; the energies of the constructors were particularly applied to perfect this b branch of architecture, and they had arrived at producing works, remarkable from the twofold point of view of combination and execution. Wood lent itself better than any other material to the architectural conceptions of the 15 th century, and it was profusely employed in civil and religious structures; one should not be astonished if at that epoch, carpenters had attained a superior degree of skill.

We give (14) a transverse and a longitudinal section of the carpentry of the cathedral of Rheims. The trusses are designed on a triangle with not less than 47.3 ft. b.se and 50.9 ft.

carpentry; there is no strong connection between the trusses; the ties intended to prevent movement are too small and weak to be effecient in fulfilling that function in an effective manner, and the proof of it is, that when the battens are removed, one can move with the hand the main trusses and particularly the trussed supporting purlins. The means adopted to resist the thrust of the rafters against the kingpost is only an expedient. Yet already the carpentry of the cathedral of P Paris, perhaps erected several years after that of the choir, presents notable improvement on that . But it is particularly in studying the base of the spire of the same church, that r rises in the middle of the crowning, that one is struck by t the skill and especially by the practical science of the carpenters of the 13 th century, and that base of the spire mus t have been arranged for hoisting about 1230 at latest. We shall have occasion to return to this elsewhere. We follow our subject and illustrate the improvements successively introduced into the system of trusses.

The carpentry of the cathedral church of Chartres, burned in 1836, and which appeared to belong to the second half of the 13 th century, already presented great improvements over the system adopted in the construction of the cathedral of Paris; unfortunately we posses only too vague sketches to be able to give it to our readers. That is the more to be regretted because that carpentry was vast, it had suffered no alterations, and the timbers were all squared with sharp angles a and perfectly joined.

The carpentry of the church of S. Ouen at Rouen, which dates from the 14 th century, in moderate dimensions gives a fine example of the art of carpentry at that epoch. We give at A (12) the transverse section and at B the longitudinal section. Already that carpentry possessed an under ridge-piece C, on which rested the heads of the rafters halved together and held by pins. This ridge-piece itself is kept horizontal by the g great X-braces D and the braces E. The S. Andrew's cross and the braces halved together also have the purpose of preventing the overthrow of the trusses and of the entire snstem. The g great doubled vertical ties F, attached at G to the principal by iron pins and at H to the collar beam by wooden keys, suspended the tiebeam at I, already hung to the kingpost at M. T

two pairs of verticals N and the beams P. Thus no deformation is to be feared in the great triangle forming the truss. But there is a hip truss receiving at its top the ends of the rafters of the chevet as shown by the plan in Fig. 8; now that truss was thrust agaenst by all the rafters that come to rest on the kingpost at one side; it became necessary to leave its vertical plane. See how the carpenters avoided this danger. Fig. 10 gives the section of the roof on the longitudinal axis of the chevet. Q is the main truss whose elevation is given in Fig. 9; at R all the rafters of the hip abut against its top. To maintain it in the vertical Q,S, the carpenters placed the great inclined timbers T U, V X. The first rests on the plates at T, and is connected to the second by a joint at V. The second joins the end of the kingpost of the fifth main truss, and from that point two vertical timbers set in V form carry the thrust to a great distance to the ends of a tiebeam, so as to peevent spreading the branches of this V, as indicated by Fig. 11. The inclined timber T U is further supported from the kingpost Q and two false kingposts Y Z by strong doubled timbers and keys. To that inclined timber T U, that indeed is a very strong principal, is connected the three struts C' designed to abut the thrust of the rafters of the hip and to maintain the main truss in its vertical plane Q S. The remaining parts of this carpentrw require no long explanations to be understood. The circular plates of the hip are kept in place by a tie D' supported by a pair of ties F' from the axial rafter, that is doubled and fulfils the functions of a principal, for it joins the end of the inclined timber T U. This tiebeam supports a frame a b c (Fig. 8) intended to r relieve the first radial rafters. The movement of the entire carpentrw is prevented by the braces H' (Fig. 10), that join the ties of the horizontal axes placed under the second radials and the kingposts of the truss. The oak battens maintain the rafters in their vertical planes, that carpentry being w without ridgepiece and purlins, like all the carpentry of that epoch. The bending of the rafters is prevented by means of r raised ties K', that are relieved by the axial ties R', and the doubled ties P' join the vertical timbers N of Fig. 9.

However little one may be familiar with the art of carpentry, it is not difficult to recognize the defects of this car-

these principal timbers. The struts I are also connected by double tenons to the blocks and tiebeams, and further they are always boxed into these principals and rafters, as represented at L. Sometimes even the principals and rafters have a block to give more depth to this boxing without weakenink the timber; this block is shown by the detail M. The struts I are either vertical or slightly inclined as indicated in Fig. 7; in the last position they better oppose the thrust at the feet of the rafters or principals. Further the steeper the roof, the more nearly the struts approach the vertical. The means adopted to set the carpentry of the roofs is well known, and one will e easily understand the general system accepted by architects from the beginning of the 13 th century in the construction of their great roofs.

Let us then take as an example of one of the earliest carpentry roofs, that of the choir of Notre Dame of Paris, thus we shall have in a small number of illustrations ordinary trusses, trussed supporting rafters and a hip. Fig. 8 gives the p plan of the hip, that covers the chevet. The main trusses are coupled. The side A of the plan presents the horizontal projection of the plates and of the thickness above the wall; the side B is the horizontal projection of the primary radial timbers. Fig. 9 is the elevation of the main truss C of the hip. In this elevation are visible the great principals E and two lower principals F. This was a powerful means for maintaining the kingpost G in its vertical plane and for giving strength to the truss. The first collar beam H connects the principals, under principals and the kingpost. The second collar beam I is composed of two timbers connecting the same timbers between them. The third collar beam K connects by mortise and tenon the kingpost and the two principals. The tiebeam L is hung to the kingbost, first by two timbers M and keys, second by two pairs of double verticals.N likewise held by keys on the subprincipals and on the first collarbeam. Two other pairs of timbers O replace the end struts and connect thenprincipals with the tiebeam. As an excess of precaution braces P transfer a part of the weight of the tiebeam to posts against the wall. These braces cannot thrust against the walls, since they are placed at the external flying buttresses. The flexure of the principals of this truss is then stopped by the kingpost, the

the advantage of only requiring a bearing as this as possible; second instead of transferring the load of the entire roof and its covering to the main trusses (like the system of carpentry with purlins), it uniformly distributed the load along the entire top of the wall or eave wall; we emphasize the importance of that arrangement in Art. construction; it suffices to indicate it here; third this new method permits the use of timbers of small dimensions relatively to their length, since each o principal or rafter was equally loaded, and thus to place at the top of very high structures carpentry very light in regard to the area covered. In making the internal piers of the great naves more slender, the constructors made the vaults very light; they must naturally seek to diminish the weight of the c carpentry intended to cover them, and especially to avoid dangerous inequalities in the weights of the upper parts of the structure.

It is proper for us to give an exact account of what form the essential part of the carpentry of the roof combined with the method of pointed construction. We shall commence with the placing of these roofs on the eave walls or the tops of walls.

Let A (7) be the top of the stone wall; two plates B B' are set flat rather than square. C is the tiebeam of the main truss fixed on the two plates by dovetails, as indicated at E E' in plan, so that the tiebeam holds the plates pushed outward by the trussed supporting rafters. D is the block on which is fixed by mortise and tenon the trussed supporting rafter; this block is gained to fit the two plates and so is held by them. F is the principal, G the rafter. If the space between the main trusses be too great, and if because of the span of the nave to be covered, it is feared that the two plates may bend at the middle, caused by the thrust of the rafters, two horizontal timbers H are placed between these plates and transfer this thrust to the points E fixed by the ends of the tiebeams. Struts I carry a part of the load of the principals or rafters to the inner end of the blocks, and give a footing to the large inclined timbers. Frequently in great carpentry works, the feet of the principals and rafters are connected by double tenons and mortises, as indicated by the detail K, so as to prevent the thrust from being exerted on the very narrow area of a single tenon, and also to prevent the torsion on th-

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Let A (7) be the top of the stone wall; two plates B B' are set flat rather than square. C is the tiebeam of the main truss fixed on the two plates by dovetails, as indicated at E E' in plan, so that the tiebeam holds the plates pushed outward by the trussed supporting rafters. D is the block on which is fixed by mortise and tenon the trussed supporting rafter; this block is gained to fit the two plates and so is held by them. F is the principal, G the rafter. If the space between the main trusses be tso great, and if because of the span of the nave to be covered, it is feared that the two plates may bend at the middle, caused by the thrust of the rafters, two horizontal timbers H are placed between these plates and transfer this thrust to the points E fixed by the ends of the tiebeams. Struts I carry a part of the load of the principals or rafters to the inner end of the blocks, and give a footing to the large inclined timbers. Frequently in great carpentry works, the feet of the principals and rafters are connected by double tenons and mortises, as indicated by the detail K, so as to prevent the thrust from being exerted on the very narrow area of a single tenon, and als to prevent the torsion on th-

and mouldings that decorate it. But before describing that c carpentry, we must indicate the profound modifications introduced into the art of carpentry about the end of the 12 th century, because of the adoption of a new general system of construction. It was no longer by the thickness of the walls or by massive buttresses that were abutted the central vaults of churches with several aisles, but by flying buttresses transferring the thrust to the exteriors of the edifices, whatever their width. The system of equilibrium replaced the antique or Romanesque system (Art. Construction); henceforth in monuments composed of three or five aisles, the internal piers were reduced to as small a diameter as possible, and no longer had any function other than to support the arches and the springings of the vaults, under side arches of which opened wide windows. These side arches and the archivolts of the windows could receive on their extrados only eave walls, whose thickness could not exceed the diameter of the internal piers; it resulted from that innovation, that these eave walls presented a section quite weak, particularly if as often occurred at the beginning of the 13 th century, it was also necessary to find besides the eave wall at the upper part of the edifice a gutter for the removal of water and a railing. The course on which rests the plate of the great carpentry roofs was then quite narrow and was reduced to about 3.3 ft.; sometimes though rarely more in monuments of great extent, and much less in naves of moderate width. It became impossible on such thin walls to find the space necessary for resting the feet of principals, rafters, and for the projection of the thickness of the purlins. In order to fully set the carpentry on these thin walls, the slope of the roof was first changed from 40° to 50° to 60° and even 65°, and then were omitted the purlins set on the principals, and the roofs were composed of trusses between which were set rafters trussed nearly like t them, set flust with the plane of the exterior of the principals, and only differing from the main trusses in having no tiebeams at their bases, but resting only on cross-beams fixed on the double plates. This carpentry is designated by the name of carpentry with trussed supporting rafters. In the art of c carpentry, this was a new method of construction in perfect h harmony with the new system adopted in masonry. First it had

Frequently the constructors did not make great efforts to solve the problem; they were satisfied to erect at certain distances masonry piers on the extrados of the vault, placed the principals on these piers, then the purlins on the principals with the rafters and tiles. But then the entire weight of the carpentry and of the covering rested on the vault, often badly abutted, deformed them and overthrew the eave walls. Some constructors took a wiser method, and replaced the tiebeam by two timbers C D, E F halved in cross form.(Fig. 6). Employing timbers of enormous dimensions, but reduced betwben the joints to lessen their weight, they could then by the strength of d double pins or tenons, prevent the spreading of the principals for a certain time. Still this sort of carpentry could not l last long;[1] the principals, having generally an inclination of 45° to 50°, loaded by heavy tiles, tore out tenons of the two false ties and spread outward. That is why in most edifices, men carried the eave walls up as indicated by sketch H,[2] so that the cornice attained the level of the crown of the v vault, and men set the trusses with tiebeams K above the vaults. But they could consider the enormous and useless construction required by the last means.

Note 1. p. 9. We have only found the ruins of this sort of carpentry very coarsely executed, and again employed in the roofs of a later epoch; for example at Vezelay, and in the little churches of Burgundy and Lyonnais.

Note 2. p. 9. As in the nave of the church of Beaune.

During these experiments the cross vault was introduced. Yet in the first moments, the crowns of the transverse and diagonal arches of the new vaults reached a higher level than that of the crowns of the side arches, as at the cathedral of Langres, and still again in the choir of the cathedral of Paris, and it was necessary to have recourse to the system of carpentry represented in Fig. 6. It was only at the beginning of the 13 th century, that the cross vault having reached its perfection (Art. Voute), the carpentry of the roofs could freely develop, and promptly adopt combinations both stable, solid and light.

The most ancient carpentry erected over a pointed cross vault known to us, is that of the cathedral of Paris; it cannot be later than 1220, if one refers to some details of sculpture

study the art of carpentry of the middle ages in an assured and useful fashion at the moment, when architecture leaves Romanesque traditions, and a new method of construction starts from a principle opposed to antique construction.

Note 1. p. 6. Carpentry of the church of Villeneuve, 13 th century.

We must subdivide the carpentry of roofs (since this will first occupy us) into carpentry designed to cover vaults and into visible carpentry. The first has only a useful function because not seen from the inside of edifices; it must therefore sacrifice everything to stability. The second supports the covering of lead, slates or tiles, and becomes a means of interior decoration.

When during the Romanesque period men undertook to cover n naves or halls of great edifices by vaults, the tunnel vault was the first form selected.(Art. Architecture Religieuse). The covering was directly placed on the extrados of the vault; this was indeed the most natural method. But in the North of France, they soon recognized that coverings placed directly on the vault could not protect it efficiently, repairs were difficult, for the rainwater being introduced under the joint of a slab or a tile, injured the vault far from the point where the leak occurred. They then thought to protect the vault by carpentry intended to isolate the covering and permit the rapid and easy repair of the least injury. But the system of tunnel vaults compelled constructors, either to raise eave walls to the level of the crowns of the vaults, so as to allow the tiebeams of the carpentry to pass, or to pass through them ties, if the eave walls were left below the crowns of t the vaults.

Let (6) be a pointed tunnel vault, for example like those of the cathedral of Autun or the churches of Beaune or Saulieu; the cornices of the eave walls are at A, the level of the crown of the vault is at B; when it was only required to form a slope on the extrados of the vault to set a covering of stone slabs or of Roman tiles on the vault, the low level of the cornice A had a perfect motive; but when without rasing that level, it was desired to place carpentry to receive the covering, it was necessary to have ties or to find a combination of connection of timbers, that would replace that essential member.

Therefore this still requires very thick walls to avoid overhang inside, like that given in Fig. 2. They soon avoided this inconvenience by framing the purlins into the principal itself instead of placing them on it, thus was gained the depth of the purlin, and even in framing them flush or below the upper surface of the principal, a place was reserved for the rafter, which did not exceed the inclined plane touching the upper faces of these principals.

Note 1. p. 5. We owe this drawing as well as the full explanation to the courtesy of MM. Durand and Alaux, architects at Bordeaux.

Fig. 4.[1] explains this combination. At A are the purlins, at B the ridge-piece; the dotted line C D indicates the rafters. Thus the walls can be reduced in thickness. The ends of the tiebeam are dovetailed into the plate E; that at F is notched to receive the ends of the rafters, that are fixed to the ridge-piece, purlins and plates by oak pins. But this method presents quite great defects, the purlins are weak if set flat; they rest only on their tenons. So this system of connection will be rarely employed; we shall scarcely find it employed in the North. Curved struts, if the principals are too weak, must cause the tiebeam to deflect by their pressure on it. T These trusses can only be employed to cover narrow naves, and could not retain their rigidity, if made in great dimensions. These examples show that the carpenters did not regard correctly the function of the tiebeam, which should only prevent the spreading of the principals, but it cannot and should not support any load; so they quickly changed the struts A (Fig. 3), turning them around and fixed them in the lower end of the kingpost(5). The tiebeam then remained free, suspended by the kingpost at the middle of its span, and the two struts B entirely stopped the deflection of the principals. These elementary rules had already been adopted in antiquity; but the desire of the Romanesque architects to give their carpentry the appearance of a vault caused the preference of the vicious s system, examples of which are given by Figs. 3 and 4. The small dimensions of Romanesque carpentry yet existing and their extreme rarity do not permit us to take up the art of carpentry in that remote epoch; we should be compelled to enter into conjectures, and that is what we wish to avoid. We can only

principals, joining at F by mortise and tenon, thus preventing deformation of the truss. That bending of the tiebeam A B is feared (2) because of its length, the kingpost attached at F suspends it, and the collar beam D F is connected at G H with the kingpost. The purlins I rest on the principals, held by the blocks K, and the rafters L M are fastened on their upper sides. But if the roof has not much inclination, and it is desired that the junction of the principals with the tiebeam does not overhang inside, this system requires walls of great thickness. Indeed (Fig. 2); assume that the span N O to be c covered is 25.0 ft., the principals being 8 ins. square, the purlins as large, and the rafters 4 ins., it is evident that the thickness of the walls should be 3.6 ft., which is considerable with regard to the small width of the interior.

Thus in the small Romanesque edifices covered by carpentry, one perceives that the builders were led to give their walls a thickness much greater than that required by the weight of the covering, so as to find at the top of the wall a bearing sufficient to receive the length of these superposed timbers. The roof truss visible in the interior and framed according t to antique tradition, without a ceiling placed on the tiebeams, retains an appearance scarcely monumental; men desired to obtain a decoration by the manner of connecting and framing the timbers. During the Romanesque period, particularly in the centre, West and South of France, the architects were preoccupied by the idea of covering the naves by vaults; when they could not do this for lack of sufficient resources, they sought to give their carpentry in the interior the appearance of a tunnel vault.

We see some attempts of this kind made in the little edifices of Guienne, that date from the 12 th century. We give (3) one of these carpentry works from the church of Lagorce near Blaye.[1] The tiebeam is chamfered on its angles. The chamfers stop at the joints to leave all the strength of the wood where a tenon enters a mortise. The struts A are framed to form a curve with the upper parts of the two principals, a complete semicircle. The kingpost B receives the tie C, that relieves the ridge-piece D by means of inclined connections. These connections prevent the overthrow of the trusses and maintain th them in a vertical plane; the principals support the purlins.

buildings roofs of small inclination; this form required the use of timbers of very great dimensions to resist the weight of the tiles. In Romanesque architecture, even in the North, we see the roofs long retain a slight inclination, and it is scarcely till about the middle of the 12 th century, that they assume steeper slopes. These modifications in the form of coverings again contributed to the abandonment of great timbers for the carpentry of roofs. It must also be stated that the species of woods employed by the northern carpenters in edifices were not the same as those generally used by the Greeks and even the Romans. The latter seemed to prefer the resinous species, fir, larch and cedar, when they had to cover a monument; these woods required greater dimensions than oak, preferred to the white woods during the middle ages in the North and West of France.

The Normans, a seafaring people, seem to have been the first in those countries, who made a considerable advance in the art of carpentry. It is certain that from the 11 th century, they erected vast edifices entirely covered by great visible carpentry; England still possesses a good number of these works of carpentry, that although erected in the 13 th and 14 th ce centuries, are combined after entirely original methods, and appear to be the result of more ancient traditions. What characterizes Anglo-Norman carpentry is its analogy with the means of assemblage employed for all time in naval architecture; but we shall have occasion to return to that part of our subject.

The naves of the church of the abbey for men and that of T Trinite of Caen were evidently at first covered by visible c carpentry, and already the slopes of this carpentry become t tolerably inclined. In the centre of France and the East, the traditions of antique carpentry were quite accurately retained until the end of the 12 th century. Now for the carpentry of roofs, with which we shall first occupy ourselves, the system borrowed from the ancients is very simple. It consists in a series of trusses supporting purlins on which rest the rafters. The primitive truss often has no kingpost; it consists (1) of a tiebeam A B, two principals A C, B C, and a collar beam D E, intended to prevent the principals from bending and curving under the load of the covering. If these trusses have a greater span, a kingpost C F is added, receiving the ends of the two

Naturally under the reigns of Merovingian kings, among the traditions of Roman structures, carpentry was one of those best preserved; the soil was not exhausted, the forests still covered a great part of Gaul, and timber was one of the materials preferably employed in public or private structures, b because of its abundance.

Gregory of Tours cites a great number of churches, villas, bridges, houses and palaces, in which wood played a great p part; without this text, the frequent fires, that not only d destroyed an edifice but entire cities during the Merovingian and Carlovingian periods, indicate sufficiently that carpentry was much practised until the 11 th century. This art must have then attained great perfection, compared with masonry. Unfortunately examples of carpentry of a remote epoch are lacking to us, and we do not believe that any exist preceding the 12 th century. We are then compelled to take the art of carpentry at that time. But before giving examples it is necessary to briefly trace the course followed by that art, and to indicate the causes, that have influenced its development.

While immense forests, that seemed inexhaustible, furnished timbers of great lengths and large dimensions, men applied t themselves to give stability to carpentry, rather by using g great timbers than by seeking combinations in accordance with the properties peculiar to that material. We have under our eyes the proof of this fact. For example in England, the Anglo-Norman carpentry which dates from the 13 th and 14 th centuries, compared to our carpentry of the same epoch remaining in the West, Burgundy, Champagne and Ile-de-France, is much stronger in dimensions of timbers, and their stability in great part comes from the enormous dimensions of these timbers. In France after the 13 th century the art of carpentry consisted in seeking combinations to supplement the small dimensions of timbers employed. Already the forests were thinned on the continent, and no longer furnished those trees of two centuries in sufficient quantity, so that builders were obliged to replace the volume of timber by a judicious use of its properties. It was then necessary to lighten the carpentry in the same degree that masonry structures themselves became lighter in departing from Roman traditions.

The Greeks and Romans only adopted for covering their build-

CHARNIER. Larder. Bonehouse. Cemetery.

Phoperly signifies a structure in which were stored salt m meats. This name was also given to cemeteries, and to enclosuries for interments. At the end of the last (18 th) centuryt the cemetery of the Innocents at Paris was still designated by the name of Charnier des Innocents.

CHARPENTE. Carpentry.

By this word is understood every combination and assemblage of large timbers for the construction of public or private b buildings.

The art of the carpenter must have been one of the first am- among those, which men applied to their needs. To fell trees, trim off their branches, connecting their tops in the form of a cone, filling the intervals left between the trunks by slender stems, leaves and mud, certainly was the primitive habitation of man, which is still found among savage peoples. In G Greek antiquity (so far as one may judge by the few edifices that remain to us, carpentry was of great simplicity. However the Greeks already knew the arrangement of carpentry, that we designate by the name of truss.

The Romans must have been very skilful in the art of carpentry, for the spherical or cross vaults erected in great numbers by them required for their construction combinations in carpentry, very complicated and difficult to put together. In their military establishments, they employed wood in profusion; to be convinced of this, it suffices to observe the reliefs of the column of Trajan at Rome. The countries of Europe into which they carried war were further almost entirely covered by forests, that they cleared to a great extent, as much to enable their armies to penetrate into those half savage regions as for their own needs. Already under the Roman empire, Italy could no longer supply timber in sufficient quantity for the needs of the ruling people, and the forests of Gaul for several centuries, served to supply the navy and the vast establishments of the Romans. The facility with which they p procured then that primary material, explains how they could very rapidly complete certain colossal works, such as bridges, roads, dams, dikes, military encampments of great importance, enclosures of walls and of besiegers' walls, public edifices and entire cities.

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By

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Inspector General of Diocesan Edifices

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with them all persons who prided themselves on good taste.

The capitals of the beginning of the Renaissance give us still a great number of charming composition, in which the antique element does not cause the native originality to disappear; but these capitals are nothing more than a decoration; their function as a support is suppressed; the lintel reappears with the entablature, and the capital during the course of the 17 th century is no more than a bastard copy of antique sculpture.

END OF VOLUME II.

sculpture is not Norman; it rather adheres to the school of the banks of the Loire and the province of Chartres.

The examples previously given were taken from the capitals having as function bearing the arches of a vault. The architects of the middle ages employed not only the column to support vaults; they were also used as supports intended to relieve the b beams of houses and main girders of the floors. In that case it was necessary for the capital to be much enlarged or to p project strongly in the direction of the span; while in the other direction it was unnecessary for it to have a width greater than that of the timber supported. In other terms, the capital was only a double corbel placed on the top of a column, as one places a cap with its straps at the top of a wooden post, when it is necessary to relieve the span of a horizontal timber in carpentry.

The private dwellings of the 12 th, 13 th, 14 th and 15 th centuries have retained a great number of this sort of corbel capitals, generally they are without ornaments; they are still to be seen in the houses of Dol in Brittany, at Mt. S. Michel-en-Mer, in Normandy and Picardy, finally in provinces in which wood enters much into the construction of private houses.

Here (54) is one of these capitals, that we were able to d draw several years since, in a house demolished at Gallardon near Chartres; it dated from the first years of the 14 th century. The superposed stone block was evidently intended to b bear a second column of stone in the upper story. The capital is so well suited in civil architecture, as a cap designed to relieve the spans of girders, that we find them in the court of the hospital of Beaune (15 th century), where they rest on octagonal shafts, are divided at top into three corbels to receive the girder of the facade and a transverse beam supporting the joists of the portico. (55).

We do not think it neccessary to multiply examples based on such a true principle. With the progress of the Renaissance of the 16 th century disappeared these ingenious and always reasoned combinations, sometimes beautiful. The antique orders, p proportioned in far more rigorous fashion than the ancients had used, took possession of architecture about the end of t the 16 th century, after a long struggle between good sense of constructors and the formulas of some theorists, who had

found capitals with figures, but which are rather caracatures or representations of the fables in vogue, that of the sacred legends.

We have said a word of the Norman capitals of the 13 th century, when the architecture of that province ceased to be a copy of the French architecture of the reign of Philip August. At the moment when the architects of Ile-de-France, Champagne, Picardy and Burgundy abandoned the square abacus to adopt polygonal forms intersecting because of the arrangement of the arches of the vaults, and to avoid projecting angles and useless horizontal surfaces, Norman stonecutters did not take as much care; they avoided these complicated traces, that could only be determined when the beds of the imposts were known, and consequently the places, form and direction of the arches; they adopted a method that suppressed rectilinear geometrical combinations, and about 1230 gave to the abacuses of capitals the circular form, always when the arrangement of the piers permitted, and particularly (this goes without saying) when these piers are cylindrical. The cathedrals of Coutances, Bayeux, Dol, Mans, Seez and the church of Eu give us numerous examples of these capitals with abacuses in form of disks. What they did for the capitals, they likewise did for the bases. (Art. Base).

Here (52) is a capital in two courses from a pier of the n nave of the cathedral of Seez erected about this epoch (1230), and (53) is a capital from a little column of the same church belonging to the same construction. Already on the great capital the leaves are sculptured in a dry and mannered fashion, that is far from that suppleness of the ornaments of the same kind belonging to Ile-de-France or to Burgundy. There is something of uniformity in the making and composition of that sculpture, a great poverty of invention and a desire to produce effect by the multiplicity of details and labored execution. This defect is still more apparent in the English edifices of that epoch. It must also be said that the imposts of arches seem badly supported by these circular abacuses, that no longer indicate the bearing of each arch and its direction, like the angular sides of the French capital. But in the choir of the cathedral of Mans are found capitals with circular abacuses, whose rows of crockets are very beautiful. But at Mans the

of Limoges. (Last years of the 13 th century). This capital supports nothing; it is only an ornament, for the mouldings of the arcade placed on the abacuses are exactly those of the pier. One sees with what delicacy are rendered and even exaggerated the least details of the leaves; here are no longer crockets but always two rows of leaves; as for the bell, its top is lost in the upper crown. It must be said in passing, that this sculpture is executed in granite; thus at that epoch the architecture adopted is so imperious, that it no longer takes into account the nature of the materials, even the execution of the details of the sculpture.

Fig. 51 presents a capital from the springings of the diagonal arches of the cathedral of Carcassonne.(Beginning of the 14 th century). The sculpture is broad relatively to that of this epoch, suited to the place and the scale of the monument; there is still seen in this monument a last intention to make appear the mass of the crocket; but the desire to imitate the flexibility of the plant, realism, as said today, dominates the artist and causes him to lost sight of the monumental effect. This capital at a distance , in spite of the qualities that distinguish its sculpture, only produces confusion, and it is one of the best among the good.

At the end of the 14 th century capitals have so little importance in the monuments, that one scarcely distinguishes them. Then every horizontal line, all sculpture that arrests the e eye, and prevents it from following the vertical lines of the architecture, evidently hurt the masters; to disguise the importance of the capitals, already so small, the architects r reduced the abacus to a fillet or very small round masked by the foliage; if this abacus still exists, it is scarcely suspected; it is only a guide for the sculptor, a bearing on which to place the impost, to not break the sculptures.

About the middle of the 15 th century the capital was generally suppressed, and reappeared only at the beginning of the Renaissance, when seeking to approach to antique forms. If e exceptionally the capital still exists from 1400 to 1480, it is low, decorated by very much divided foliage, by thistles, brambles and passion flowers; its astragal is heavy and thick, and its abacus is meagre. This last capital is really but a ring. Also sometimes in the edifices of the 15 th century are

in the study of an art, one comes to comprehend the beauties only after having pointed out the defects and abuses, when t these are only the exaggeration of a principle pushed to the last limits.

We shall not weary our readers by multiplying examples; besides that would be useless, for if there is great variety in the details of the capitals of the end of the 13 th century and the beginning of the 14 th, they have an uniformity of a appearance, that must relieve us from giving a great number of copies.

It is not possible to admit, that at the end of the 12 th century and until the middle of the 13 th, architects were not occupied with the design and decoration of capitals. This architectural member then belonged too much to the construction; it had too serious importance from the point of view of solidity and resolution of forces, for the architect not to impose its general form, its outline, but also the arrangement of its details. The architect then created an architecture; all the different workmen that aided in the work, were only hands laboring under the inspiration of an intelligence, that alone knew to what result should tend their isolated efforts. At t the end of the 13 th century it was not thus; the architecture was created; the master of the work could henceforth depend on the stonecutters and sculptors to execute conceptions never based on fixed laws. An impost of arches being given, the course including the capitals was left to the sculptor, and he found the angles of the abacus and the astragal cut, indicating the imposts of the arches and the section of the pier; he had nothing more to ask; he could execute his personal work with every assurance; if he pleased in his workshop, paying little attention to the place arsigned to that block of stone, frequently carving delicate foliage on a capital intended for a great height and broad ornaments on those to be placed near the eye. Thus the excess of the method, the foreseen in everything brought confusion in the execution of the details.

We shall then select among the capitals of that period of pointed art those appearing to have been most judiciously sculptured for the places they occupy, and also for the appearance of the function they fulfil.

Fig. 50 gives a capital from the triforium of the cathedral

entire method, that such skilful hands as those of the sculptors of that epoch could derive from that system of decoration; indeed an innumerable quantity of these capitals from the middle of the 13 th century are charming works in execution and graceful composition. Yet the architectural entirety loses grandeur from the degree that sculpture commences to devote itself rather to the imitation of nature than to satisfy the general principles of the art. The capitals of that efoch already become confused; but the bell is well seen and properly outlined, the abacus still being broadly profiled (p (particularly in Ile-de-France) supports the upper members, that the capitals are intended to bear.

In Champagne the decadence makes itself felt sooner; from 1240 the abacuses of the capitals become excessively meagre; the groups of leaves are more numerous, more appressed and d divided, bringing extreme confusion into these important parts of the decoration of edifices. At the end of the 13 th century the capital already exists only as an ornament, no longer having any useful function; the piers are divided into clusters of a number of columns at least equaling the number of arches; the form of the corbelling given to the capitals from the beginning of that century no longer has any reason to exist; t they lose their projection and height; henceforth sculptured in a single course, including the abacus, for little columns of different diameters, they only form a sort of garland of foliage at the springings of the arches. But the design of crockets or groups of leaves makes itself felt for long, but t these are so appressed, their intervals are so well filled with foliage and stems, that one scarcely suspects the bell. Not c content with having brought confusion into the beautiful compositions of the beginning of the 13 th century, sculpturs were pleased to crumple their foliage, to twist it and exaggerate the modeling. From this labor and forgetting the effect of the whole in the execution of the details results a monotony that fatigues, and as much as one loves to see and to study those broad and fertile primitive capitals of the pointed era, so much courage is required, we will say, to seek to disentangle this disorder of leaves, with which the artists of the 13 th century ornamented the bells of their capitals. But it is necessary to know them, for nothing should be neglected

of the mullion, to avoid haste and cutting away the stone for its entire length, a precaution of the stonecutter not always taken by the architects of the first half of the 13 th century. That position given to the abacus of the capital is not entirely reserved to the little columns of the mullition, it is again adopted from 1240 to 1245 for the capitals of the transverse arches, where as at S. Chapelle of the palace, for example, the members of the mouldings are inscribed within a right angle presenting its vertex at the intrados.

Later about the end of the 13 th century and the beginning of the 14 th, the right angle presenting its vertex on the f front of the abacus of the capitals of the mullions appeared too strong, abrupt and important, giving too pronounced a shadow; retaining the principle of an angle in front, the abacus of the capitals of mullions was traced as a regular hexagon.

We present (48 bis) a capital of the simple mullions belonging to the windows of the apsidal chapels of Notre Dame of Paris; its abacus is hexagonal, as indicated by the horizontal section A. The shaft of the little column is prolonged to the top edge of the bell, which is again one of the special characteristics od capitals of the end of the 13 th century; that bell is decorated by groups of leaves taken from the indigenous flora and the crocket has disappeared. These capitals date from the first years of the 14 th century; they are painted in the interior; the bell is red, the leaves gold as well as the upper part of the bell, the astragal purple, the cove of the abacus greenish blue, its fillet is purple, and its t torus is gilded.

About 1240 the decorative leaves of capitals expanded completely, and instead of being copied from thick and herbaceous plants, they are preferably gathered from trees with tall trunks; oak, maple, pear, fig or beech, or fine perennial plants like holly, ivy, vine, brier or raspberry. The imitation of nature is already perfect and even labored, as may be seen on a capital of the arcade of the upper S. Chapelle of Paris.(49). Still found in that example is the crocket of the beginning of the 13 th century; but its end has no buds but is a group of leaves; on the bell already wind the stems; the leaf no l longer belongs to architecture but is independent; it is like an ornament attached around the bell. One will understand the

and detached upper ends; then these leaves soon appeared to not assume sufficient importance, and they were replaced by a first row of expanded crockets. (1245 to 1250), (46 bis A and B). The capital of the mullion by the relief of its ornamentation could thus attract the attention, preoccupied by the multiplicity of vertical shadows. Thus gradually the sculpture became more detailed and more complicated, as the architectural members were subdivided; the masters remaining slaves of a principle, lost sight of the general effect. Another moulding added to an arch or mullion compelled them to change the scale of all the details of the sculpture. Even in certain provinces from 1235 to 1245, in Champagne and Normandy, they regarded the capital of the mullion as a simple ornament intended to mark the point of starting of the curves; they sometimes suppressed the abacus that presented a projection or c corbelling, the resting place of a body too large for the shaft of the little column; the crockets or foliage alone came to stop the little shafts of the mullions.

Here is an example of this last mode, taken from the upper windows of the nave of the cathedral of Evreux.(about 1240; Fig. 47). So as to produce more effect, these capitals are p pointed in the interior; the bell (if one can give this name to what is only the continuation of the shaft of the little column) remains the color of stone, the upper leaves being olive-green bordered with black and also lined with dark purple; the lower ones are white bordered, edged with black and also lined with purple; the astragal is vermilion. In Champagne the mullions of the upper windows of the nave of the cathedral of Chalons-sur-Marne (same date) also have capitals without abacuses.

As we have often said already, the masters unceasingly desired to perfect and give more unity to architecture. The circular abacuses in the midst of the adjacent angular members h had a soft and undivided appearance, that could not satisfy them; they wished to find angles, yet did not fall into the fault recognized in the square abacus.(Fig. 45). They frequently adopted the method given by an example (Fig. 48); i.e., they placed the abacus with an angle projecting in front, as indicated in the horizontal section A, taking care for this abacus and the ornaments of the bell not to exceed the width

should themselves retain the appearance of strength. On the other hand, the capital adapted to the tracery finds itself outside the common rule imposed by the pointed system; it supporst nothing, since the upper moulding of this capital is i identically similar to the lower little column.(Art. Meneau). That greatly embarrassed architects accustomed to give a function to each member of the architecture, however little its miportance. Reason had indicated placing no capitals on the mullion, but that would have had a soft and disagreeable appearance; besides the capital of the mullion was placed at the end of a little column on edge of the grain, serving as support for the upper foils, and with anchoring for the transverse iron bar always placed at the springing of the curves. Then a admitting that the capital is necessary at that point, to it is first given the square abacus according to accepted usage (45), as on the mullions of the upper windows of the cathedral of Paris (1225 to 1230), and a single row of crockets supporting the angles of this abacus; but the two angles A bore nothing and had no reason for existence; the system was changed. This capital of the little columns of the mullions was an ornament and not a support, which was quickly recognized; the square abacus was suppressed, and replaced by a circular abacus (about 1225); the projecting bell was retained under this abacus, with the astragal and a row of crockets as ornament. (46). Rationalists of the time even went so far as to suppress the crockets and contented themselves with the ring, that alone marked the transition between the verticals and the curves of the tracery. One can see these capitals of mullions with circular abacuses on the windows of the S. Chapelle of Paris, the apsidal chapels of the cathedral of Amiens, the chapels of the nave of the cathedral of Paris (about 1240). The horizontal sections of the mullions then commenced to give, not merely one or three little columns with two bevels, but more complex mouldings: that was caused by reasons, that we do not have to examine here.(Art. Meneau). The multiplicity of these vertical ribs, the shadows cast by them absorbed the capital, whose simple decoration could not compete with these effects of light and shade; it was necessary to ornament more the bell of the capital; there was added beneath the crockets a row of leaves closely attached to the bell at th ir start

appeared heavy; they sought in the forests lighter and more s subdivided leaves; the crockets gradually lost their primitive form of buds to be only groups of leaves developed and recurved at the end of the twig. These transitions were so rapid, that they must be seized in passing; from one year to another, changes make themselves felt.

In the cathedral of Nevers, a monument that cannot be studied with too great care, because of the curious modifications it has received, one still sees in the nave a triforium that dates from about 1230. The capitals of this triforium were e executed by skilful sculptors, and they present the last traces of abundant ornamentation, rich from the beginning of the 13 th century with a marked tendency toward the imitation of nature.

We give one of these capitals. (44). Its leaves however already recall the leaves of forest trees of France, although they may not yet be scrupulously reproduced after the flora' they might pass for the wild pear tree. The great stem of the crocket is still apparent behind the branch of foliage. The heads of the crockets are no longer buds but are developed. The abacus is an irregular polygon, a square with cut-off angles; this capital still retains its four primitive crockets under the small sides of the polygon.

About 1239 operates a new change; a crocket is placed under each angle of the abacus; as many projecting corners, so many crockets, or better said, supports; that was logical. But then also the crockets being more numerous around the bell diminish in volume and become less powerful. When the capitals were of great diameter, it was necessary to fill the interval left b between these crockets by repeated leaves (Figs. 32,33); when they were delicate and set on slender columns, men were contented with one crocket beneath each angle of the abacus, first with one leaf in the first row between them, they later about 1240 with the leaf replaced by a crocket. This fact is remarkable in the capitals of the tracery of windows, and can serve in determining their date.

On this subject we must enter into some explanations. While the tracery is only composed of a roll with two bevels, the appearance of strength presented by this sort of moulding requires that the capitals supporting the upper compartments s

explains this first step toward the octagonal abacus of the middle of the 13 th century. The transition is evident in the examples taken from S. Martin-des-Champs; some already h have bells with a top moulding as indicated in Fig. 40; others are like that given in Fig. 43, also have a bell but without upper edge, whose curve is lost in the bevel of the abacus. When the bell is quite distinct from the abacus, its outline is traced so as to prolong the shaft of the column above the astragal to nearly two-thirds its height; while during the Romanesque period, and even still at the end of the 12 th century, the bell begins to expand at once above the astragal, or slightly over it. It is even necessary to observe, that at the beginning of the 13 th century, the bell of the capital is slightly diminished above a fillet surrounding the astragal; that form is indicated in the capital seen here.

In Fig. 38 we have left the crockets and leaflets enclosing the bell in the state of scarcely developed buds; we find them expanded about 1220; the leaves are opened at the base of the crockets (Fig. 43); this is more leafy and divided, the buds of the flowers are no longerenclosed in a group of leaves, but spring forth on their own account. But sculpture still retains something monumental, symmetrical and conventional, that does not exclude suppleness, not that flexibility of the young shoot, but a vigorous and powerful suppleness of vegetation, that arrives at its development and can brave storms.

If we consult only our particular taste, we should say, that here is the point at which sculpture should have stopped. For in spite of their exuberance of vegetation, these magnificent capitals of the refectory of S. Martin-des-Champs retain a c character of strength, of resistance in harmony with their function. At the same time these are rich crows of columns, and corbellings whose energetic form is in accord with the enormous load resting on their heads. The eye is both reassured and charmed. But the ornamentation of that epoch could n not stop in the path any more than the general system of the architecture. Daily the members of the mouldings of arches t tended to be divided; simple planes were excluded, and were replaced by rounds with ribs, separated by deep hollows. The capitals that supported these subdivided ribs must suffer new transformations. At first these broad leaves so monumental a

will be agreed that if chance alone inspired the architects of the 13 th century, as sometimes pretended, they had a rare fortune; chance then was very foreseeing and subtle. These t transformations and perfectings follow so rapidly, that great attention is necessary to follow all the phases. The bell exceeding the sides of the square abacus remained much in view; its upper edge was decorated by a simple moulding (40) or even sometimes by a moulding ornamented by sculpture. (41).

In Burgundy the abacuses of the capitals are very much enlarged with relation to the diameter of the column, because in that province the stone is strong and permits using columns comparatively slender in regard to the imposts they have to support; thus the bell expands the more as the abacus assumes more importance. On the contrary in Champagne and Picardy, w where the stone has not a great resistance, the capitals do not support a great projection, and consequently their bells are not very much enlarged; the crockets are close against them and project but little beyond its upper edge.

While these various modifications are produced in the form and decoration of the capitals, the archivolts, transverse a and diagonal arches changed their sections; instead of being taken within a rectangle with sides parallel to the edges of the square abacus, it was commenced to cut them according to the cut-off angles. The corners of the square abacus then projected uselessly beyond the lower beds of the imposts of these arches; they were cut off and polygonal forms were given to these abacuses, or they were set diagonally. The bell then had no need to have so much enlargement; its top only projected enough to almost exactly circumscribe the angles of the polygon of the abacus, as indicated in Fig. 42. Yet was not adopted without a transition the polygonal abacus for capitals. They commenced by cutting off the angles of the square abacus, so as to form an octagon with four large and four small sides, and they kept only the four crockets under the small sides of the octagon to furnish the middle point of the bell, they set a lower row of leaves or crockets springing between the stems of the upper crockets, and vertically below the four large s sides of the octagonal abacus.

The capital here (43), one of those that support the vaults of the refectory of S. Martin-des-Champs at Paris (about 1220),

it at his pleasure. It resulted from this that the analogous capitals of the same edifice frequently present very different outlines. That could not satisfy the architects of the 13 th century, who daily adhered more to leaving nothing to chance, and who proceeded systematically. Thws they came to adopt for the capitals a bell independent if the abacus, and no longer connecting well or badly by warped surfaces, as to be seen in Fig. 38. In that they approached the arrangement oi the antique Corinthian capital. But in the antique Corinthian capital the upper diameter of the bell does not exceed the curved sides of the abacus, and the abacus is only a horizontal slab beneath, whose projecting angles are supported only by open volutes, tha. terminate the scrolls. That had no inconvenience because the angles of the antique Corinthian capital supported nothin, and that consequently it was not feared that any load above should break it. But quite different is the function of the capital of the 13 th century; the angles of the abacus are useful, they receive the considerable load of the imposts of the arches; it was then important to give them greater strength.

Note 1. p. 525. By bell is designated in the capital the enlargement serving as a transition between the shaft and the abacus, an expansion around whice was grouped the sculptures.

We have seen at S. Leu of Esserent (Fig. 2),that from the l last years of the 12 th century were adopted a circular bell, whose top did not exceed the sides of the abacus, and that t the projecting angles of this abacus were only supported by crockets, to which was given an exaggerated volume (because of this overhang). When one desired these capitals to take a more elegant outline, a less stumpy appearance, and more delicate angle crockets were sculptured, it was necessary to supplement the resulting lack of strength by a greater development of the bell; its top was often traced in a manner to make it project beyond the sides of the square, as indicated in F Fig. 39. There only remained then as overhangs the little triangles A, easily supported by angle crockets. These little triangles even were not laft flat but intersected the backs of the angle crockets and the top of the bell by a bevel, that avoided any horisontal surface, all meagreness, all overhang however little. The sketch B explains that arrangement of the angle of the abacus on the crocket intended to support it. It

scrolls and the angular and divided leaves of the beginning of the 12 th century; it is luxuriant, although still crumpled and folded on itself as are the first leaves to burst their envelopes. Between these recurved leaves are perceived the b buds of the flowers. Already the stems become more ribbed, t they accent the angles in their section. But a singular thing, it is unnecessary to believe, that this growth of the ornamentation of the capitals, at the beginning of the 13 th century, imitates the growth of any certain plant; no, it is a sort of conventional form, that resembles the natural flower and proceeds like it, but to which cannot be given the name of a species.

The beautiful examples of this springtime of the French sculpture of ornament are innumerable; we shall choose one of them among the capitals so remarkably executed in the choir of the abbey church of Vezelay.(38). Unfortunately the engraving cannot give the idea of the extreme refinement of the m modeling of these recurved leaves, tha have all the thick s suppleness and puri.y of contour of expanding buds.

Never had the sculpture of ornament attained this degree of perfection in execution with such a complete and entire effect of the masses. In Burgundy and Nivernais, this beginning of v vegetation is abundant and powerful; it develops in the same sense. In Ile-de-France and particularly in Champagne, it is more delicate, the plant is less vigorous and its development is also more meagre. These observation may appear singular; y yet they are established by such numerous facts, that each one can be verified in all the monuments of the pointed period, so that one cannot dispute the reality. (Art. Flore).

But at the same time that was developed this sort of vegetation in stone, the minds of the masters did not remain inactive, as we have seen. The bell [1] of the Romanesque capital w was formed by the intersection of a cone and a cube. Desiring to give more flexibility to the sculpture and more grace to the capital, they had successively suppressed the cube and c concaved the cone in the second half of the 12 th century. But the solid that served as a transition between the cylinder and the square of the abacus could not be traced geometrically; it was a solid whose form was not defined in rigorous fashion, and that left to each sculptur the ability to carve

century became insupportably monotonous; one feels in it the manual labor, but not the impress of the imagination of the artist. We shall return to that fact.

The reasons that cause a certain form to be given to the capital, and that influence the outline of the capital being known in brief fashion, one will note that during the second half of the 12 th century, the ornamentation tends more and more to assume a useful function. The corbels and crockets intended to sustain the angles of the abacus become larger and more solidly attached to the bell (Fig. 21); yet the projection of these crockets does not exceed the corner of the square belonging to the capital, i.e., A being the angle of the slab of the abacus of the capital, the crocket will be kept within the rectangle B C D E (37). Very few exceptions to this rule are found until the moment when the abacuses begin to be outlined as polygons about 1230. On the contrary, from that moment the crockets more or less exceed the angles of the top of the slab of the capital, and for example in certain provinces they leave the bell like vigorous vegetation, to expand outside a vertical from the most projecting mouldings of the abacus.

This first observation is on the more or less extend, that the sculpture assumes in the capitals, there is another of no less importance in relation to the character itself of that sculpture. During the Romanesque period the decoration of the capitals follows traditions, repeats or arranges certain ornaments either taken from antiquity or furniture, jewels, fabrics from Lombardy or the East, while appropriating these ornaments and giving them a French charm, as in Burgundy, Normandy, Champagne, Poitou, etc.; yet one sees well that in that is an interpretation of another art. These are acclimated plants, modified by local culture, but are not indigenous plants.

About the end of the 12 th century it is entirely different; a new plant grows on the soil itself and finally chokes the exotics. About the middle of the 12 th century, certain buds at first little developed are seen to start around the bell of the capital, which are combined with Romanesque interlacings, with their leaves and fanciful animals. Gradually these buds extend and open into thick leaves, still soft and downy; the fleshy and tender shoots have the appearance of young sprouts. But already that primary vegetation has expelled the beaded

same path passed over in the same direction; but it goes so f far, that those forced to follow it, know not whither it will lead them. Antique arts retain a standard to which they can refer, for to them the form dominates the reasoning; the arts of the middle ages have no guide other than an abstract principle to which the form is subjected; that explains how in v very brief space of time, correct reasoning, knowledge and e experience, can end in the absurd, if a society is not regulated by taste. (Art. Gout).

We shall indeed be pardoned this digression in regard to c capitals; but in pointed architecture this member is of great importance; it is like a standard serving to recognize the p proportions of science and art entering into architectural compositions; it permits determination of dates, of stating the influence of such a school or even of such a monument; it is like a touchstone of the intelligence of the constructors, for until the middle of the 13 th century, the capital is not only a support, but also the point at which are equilibrated and neutralized the pressures and thrusts of pointed construction. (Art. Construction).

The history traced by us, of the transition from the Romanesque capital to the capital definitely belonging to the pointed era, must be too brief for us to not be forced to neglect numerous details. Frog the day when each column or little shaft bore its own capital, this no longer a mere question of decoration. But this question has its value, and we should treat it. But it cannot be separated from the form and the a arrangement given to the abacus.

About the middle of the 13 th century, when in Ile-de-France, Champagne and Picardy, architects strove to place the abacuses of capitals according to the figures systematically circumscribing the impost beds of the arches, the difficulty was abruptly cut in Normandy; instead of angular forms, they gave the abacuses the shape of the circle on which rested the arches w with their different members. Architecture in Normandy has in particular at that epoch, that it employs means that we esteem mechanical, in the execution of the details. Thus already is revealed the the practical minds of that people, more industrious than reasoning. This observation equally applies to the sculpture, which in England and Normandy after the 13 th cent-

unoccupied horizontal surfaces, by forcing them to subdivide the abacus of the capital, soon influenced the piers. After 1250 were already given to the piers as many columns as there were arches, and consequenlty as many capitals; they soon came to give to the piers as many members as the arches had ribs, and the capitals lost their real function of support, of corbels, to become only decorated rounds, placing a separation between the vertical lines of the piers and the springings of the arches. Then finally understanding that the capitals no longer had any reason for existence, the masters entirely suppressed them, and the arches with their mouldings descended to the bases of the piers. Thus by rigorous observation of a principle, they fell from the true to the absurd by even excess of truth; for truth has its excesses. (At least in the arts).

Men have tried to prove that pointed art in its decline ended in ridiculous and labored things; when it is considered s separately from 1400 to 1500, it is indeed impossible to divine its origin, and to predict to what extravagances it can degrade itself; but if one follows step by step the transformations through which it passes from its origin to its decrepitude, he is compelled to recognize, that the excess in it is only the exaggeration of a correct principle originally based on the application of absolute truth, too absolute since it l led by the rapid decline to such results. Taste alone, in the arts as in everything, can oppose the barrier to exaggeration, even the application of truth; but taste can no longer exist in the society, which has broken with traditions and finds itself in the state of perpetual infancy; taste is thenceforth only a sense individual to each artist, it does not exist in the state of a doctrine. Architecture at the end of the 12 th century takes its source in the reasoning of artists' they o only lay down material principles foreign to the principles previously accepted; however beautiful the form they invented, it is only a means, only a covering subject to the reasoning of the mind. Once started in that path, the succeeding artists only sought to push forward; inspired by a series of laws invariably deduced like problems in geometry, not possessing t that mental temperament called taste, they could neither return nor even stop, and they carried their reasoning so far, that they lost sight of the starting point. It is always the

at D D are the outlines of the archivolts on which rest the wall between the piers, the triforium and the great upper windows; at E E are the two diagonal arches of the vaults of the side aisles; at F is the transverse arch of the same vaults. The abacus of the principal capital had its two diagonals G H and I K parallel and perpendicular to the axis of the nave, which was caused by the outline of the imposts of all the arches. Thus they successively came to take the lower bed of the impost as the generator of the abacus of the capital. What one cannot too carefully note in the structure of the cathedral of Rheims is the system, the regularity of all parts. The outline of these imposts of arches is very skilful, and we shall have occasion to return thereto in Arts. Construction, Sommier, Voute.

It will suffice to cause to be noted here that the arrangement of the group of capitals, having but a single abacus for all, already subject to the number of principal arches and t their section, is a preliminary to detached capitals belonging to each column. The transition still is more apparent in the arrangement of the capitals around the choir of the cathedral of Amiens (about 1240). Their abacuses assume rectangular forms, that are not only modeled accurately on the outline of t the lower bed, but also accent each arch of the vaults. Thus (35) let the dotted line be the horizontal section of the pier; at A is the little shaft, that rises to the high vaults, the abacus only continued around it as a moulding without a capital, at B are the archivolts and their double voussoir C; at D is the transverse arch of the side aisle, and at E are the diagonal arches. One sees that each of these arches rests on a part of the abacus belonging to itself; it is no longer a common abacus for several arches. In perspective from the side aisle, these capitals assume the arrangement given by Fig. 36. If the springing of the capital is composed like those of the capitals of the piers of the choir of the cathedral of Auxerre, its abacus separates into as many members as there are arches. There are again only four capitals, one large anf three smaller ones, and there are already six abacuses. From the moment that the architects thus allowed themselves to be led by a s series of reasonings, the ascent was irresistible. The arches of vaults (because of the dislike of the masters for unoccup-

attached only to four sides of the octagonal abacus of the c capital of the great central column. The astragal of the little capitals also passes across the great one and indicates t the bed, and below, this great capital between the false and its true astragal presents simple sculpture more in proportion to its diameter. The ornamentation of the upper part of t the great capital participates at the scale of the small ones, while it belongs properly to the lower portion alone remaining visible. That is not the effect of chance or of a caprice of the artist, it must be admitted, but the result of a principle seeking to become more and more absolute in the least details of the construction and decoration of edifices.

From the capital of Notre Dame of Paris (Fig. 31) to that r reproduced here (32) a great advance has been made toward unity of appearance; but the four engaged columns again intersect the great capital, and the breaks that displease in Fig. 31 do not avoid the passage of the astragal across the bell of the large one. It was desired to harmonize all at Rheims in constructing the piers of the cathedral.(1226 to 1240).[1]

Note 1. p. 516. We speak of the piers of the oldest part of the nave next the transepts.

The great capital retains its own arrangement between the four others.[1] these have the entire height of the large capital in two courses; but a second astragal divides them at midheight. (33).

Note 1. p. 517. Exceptionally the four engaged columns in the piers each have a capital at the same level, the upper l little shafts resting on the capital of the engaged column next the nave.(Arts. Cathedrale, Fig. 14, Pilier).

Further, one will note the form of the abacuses on the capitals of the nave of the cathedral of Rheims; that of the great capital is a square set diagonally, those of the little capitals being octagonal; they are so combined as to exactly circumscribe the outline of the bed of the impost of the arches and the bases of the five little columns rising to the springing of the great vaults, as proved by the horizontal section. (34). The dottel line indicates the pier; at A, B B, C C are the five little shafts, that rest on one of the four octagonal capitals and support the great transverse arch, the t two diagonal arches and the two side arches of the high vaults;

Romanesque traditions. Admitting definitely about 1225, that the vaults must determine the horizontal section of the piers, to the cylindrical columns were engaged two or four columns; that new combination came to disturb the arrangement of the capitals. (Arts. Pile, Pilier).

One of the first examples of this transformation is found at the entrance of the nave of the cathedral of Paris; the first bays of that nave are of an epoch and little later t than the succeeding ones. (Art. Cathedrale). The architect by allowing to remain in the centre of the group of columns the great cylindrical pier adopted in the rest of the monument, retained its capital; he only interrupted it at each of the engaged columns.

Fig. 31 will make our description clearer. At A is seen the column, that like a reinforcement added to a pier, bears the little shafts ascending to the springing of the high vaults; at B is one of the three other columns, which support the two archivolts and the transverse arch of the side aisle; the diagonal arches rest on the circular sections of the abacus of t the great capital, again left useless in part next the nave. If the great capital is formed of two courses, the three capitals of the engaged columns B are sculptured in a single one. The instinct of the artist required that difference in height given to columns of different diameters. As for the engaged column A not supporting an arch but a group of little shafts, it has no capital. This fact indicates very clearly, that men adopted then the capital (as already done during the Romanesque period) only to support the arches of the vaults and serve as a transition, a corbelling between the wide impost of these arches and the thin shafts of the columns.

This transititory means being invented, the architects could not fail to be shocked by those displacements of decorated c courses, that abacus of ungraceful form and complicated plan. They sought to harmonize the effect of unity by the single capital having a single abacus with the requirements of proportion, that compelled having heights of capitals in accord with the diameters of the shafts and the combined columns. They solved this problem with much skill in the construction of the lateral piers of the choir of the cathedral of Auxerre (about 1230), as Fig. 32 shows. The engaged columns are here

beds of the different arches C C', D D', E within a regular octagon, and from the regular octagon pass to the circle, but the three little shafts A B B' designed to receive the three ribs of the high vaults, left the octagon with their bases; it was necessary to add an extension to the abacus to support them, and that addition to the abacus must itself be supported by an ornament of the capital, hence combinations that the a architects made with exquisite art in the decoration of the whole.

The plan of the abacus and trace of the impost, Fig. 29, c coming from the choir of the pretty church of Semur in Auxois, gives in perspective Fig. 30.[1] One sees how scrupulously the architect has avoided projecting angles presenting useless h horizontal surfaces, how he knew how to conduct the eye from the cylindrical shaft to the complicated junction of the different members of the vaults and little shafts, so as to show that the capital really supports, and that it is not merely a common decoration. Once this principle was accepted, there are in these combinations a sincerity and grace very far from our modern architecture, when most of the members are superposed without its being possible to state their function, why they occupy one place rather than another.

Note 1. p. 513. This part of the choir of the church of Semur in Auxois must have been built from 1220 to 1230.

The stone employed for the construction of the churches of Semur in Auxois is very resistant, it must be stated; it is a coarse sandstone (from Pouillenay), that although it is cut quite easily on leaving the quarry, acquires the hardness of granite.

The course of the capital reproduced in Fig. 30 is not less than 2.8 ft. high, exclusive of the abacus taken in another c course. The constructors did not have everywhere the materials of that depth of bed and strength. Then if they desired the cylindrical column in the sanctuaries,(as they did still later in Burgundy), they gave them a greater diameter compared with the impost, and they sculptured the capital in two courses, a as one can see at the cathedral of Auxerre.

Yet they did not delay to free themselves from the difficulty resulting from the springings of the members of the vaults from the single capital, and to forget this last vestige of

breaks that might appear at the angles of these much enlarged capitals, it was necessary for these corners to be supported bu sculptures forming corbels, tha this sculpture should form a sort of corbelling transferring the weight of the wide impost to a very thin shaft. The sculpturs accurately solved this problem as shown in Fig. 23. A is the transverse arch of the side aisle. The design of this capital has this strange thing, that of the four angle volutes, two recurve in one direction and two in the other, but all four are strongly supported by the bell. That method had already been employed some years ea earlier around the choir of church S. Denis for the capitals of the cylindrical columns, that date from the structure of Suger, and that support the ends of the flying buttresses rebuilt in the 13 th century. It is then easy to recognize, that at the moment when pointed architecture developed, the capital submits to the system of construction adopted, its function is necessary, and its form is modeled on the members of the a arches whose load it must bear.

However rapid the transformations in an art, there are certain customs and traditions that persist, from which men free themselves only with difficulty. Already the horizontal section of the Romanesque pier had long been abandoned, the pointed pier in the naves being composed of a cylinder with four engaged columns, while around the sanctuaries were still retained the cylindrical columns, either because that form was traditional and the clergy adhered to it, or because it separated better the side aisle from the choir, and allowed the faithful to assemble around the sanctuary to see the ceremonies better, or finally because the bays of the semicircle being narrower than the others, it was desired to give greater apparent lightness to the points of support, and to not diminish the width of the voids. (Arts. Pile, Pilier).

Yet the general system of the construction of pointed vaults frankly applied could not accord with the cylindrical column. The imperatively logical minds of the constructors excluded horizontal surfaces supporting nothing and consequently useless, however small they were. (Art. Base).

For example, to pass from an impost bed like that given (29) to the circle, avoiding horizontal surfaces on the abacus of the capital, became difficult; one could indeed inscribe the

view. The lay guilds of artizans or artists were at the origin of their power at the end of the 12 th century, and had t that intelligence in the trade, which organized itself with the purpose of producing and of progressing; they did not seek to restrict art works to the hands of a few men in a personal interest, on the contrary they favored innovations, and masters were excelled and supplanted by their apprentices, that had rapidly become bolder and more skilful. To state all in a word, the guilds were bodies and not cliques.[1]

Note 1. p. 509. Our engraving can only give a very incomplete idea of those magnificent capitals, whose sculpture is freely treated, though modeled with extreme care, and presents a varied series of compositions in the best style.

Note 1. p. 511. If these facts do not seem a sufficient proof in favor of our opinion, one can consult the Reglements of Etienne Boileau; it will be seen with what solicitude they regard the apprentices; if they compel them to remain with t their master, they desire the master to give them assured work. Constant labor by young men must naturally bring rapid progress, and it was the interest of the master to encourage this.

In the same monument, the cathedral of Paris, we see the c capitals of the piers separating the two side aisles already combined to receive exactly the springings of the different arches of the vaults. But we shall return immediately to the functions so well stated, of the capital belonging to the pointed period.

To emphasize the influence exerted by the nature of the materiels used in the sculpture of the capitals, we shall present an example taken from around the choir of the great church of Mantes, contemporary with the choir of Notre Dame of Paris, and that appears to have been erected by the same masters. The walls of the sanctuary of the church of Mantes are borne on columns of sandstone, that have no more than 1.6 ft. diameter. To resist the load above, the capitals must be likewise sculptured in very resistant sandstone, hard to work, and that it would be too dangerous to recess too much; yet they must present a considerable enlargement to receive on the upper bed of the abacus the imposts of the two archivolts, the two diagonal arches, of a transverse arch, and the base of the little shaft extending to the springing of the upper vaults. To avoid

all the beds of those different members, and contented themselves with cutting off the corners to avoid disagreeable sharp angles, when one sees the capital diagonally. But this abacus does not exaclty circumscribe the outlines given in the horizontal plane by the imposts and the bases of the little columns, there remain two useless surfaces K; they did not hesitate to avoid them.

Before passing onward we will show (27) the elevation of th these capitals of the great cylindrical piers of the cathedral of Paris next the nave. The beds of fine limestone composing these piers and their capitals of the low courses scarcely have more than 1.3 to 1.5 ft. in height. Then to give the capitals a proportion suitable for the diameter of the column, it was necessary to sculpture them in two courses. Our Fig. MA shows how the ornamentation of these capitals accords with the height of the courses, and how the two drums of the capital were very easily harmonized, although they were sculptured before setting.[1] The capitals of the piers of the choir w were carved and set before those of the nave, but present the same general arrangements; only their angle crockets are stronger and wider, the leaves are thicker and less divided. Further an observation is to be made on the subject of the capitals of the choir of Notre Dame of Paris, that we must not omit, that the capitals of the little isolated columns of the gallery of the second story appear to be of earlier work than the capitals of the great cylindrical piers of the ground story. Yet they must all have been cut at the same time, and if there were some years of difference in their sculpture, evidently t those of the triforium are later than those of the ground story. But at that transition epoch still near the Romanesque period, it is not rare to meet this sort of anachronism in sculpture. Noyon and Senlis offer examples. That depends on whether were employed at the same time artists of different ages to sculpture the numerous capitals of these great monuments; some still belonged to the old Romanesque school, others were younger and followed the new mode. Now in France men have always been inclined to prefer novelty to tradition, and the sculptures most seen and most important were entrusted to artists belonging to the new school, and the works of the old sculptors were assigned to the parts of the edifice least in

artist, than a fixed system. In abandoning the Romanesque tradition to enter into the commenced pointed, epoch at the end of the 12 th century, in the provinces of the royal domain, Champagne, Picardy and Burgundy, the design of the capitals is subject to the fixed mode; it becomes logical like the general principle of architecture; Henceforth the impost of the a arch supported by the capital will determine the form of the abacus, and that will decide the design of the capital. Also note again this fact, to which we shall frequently return, a and whose importance we cannot too strongly emphasize; in pointed architecture, the vault and its various arches impose on the lower architectural members, the supports, their number, their places and their forms in even the least details.

At the end of the 12 th century the capital became a means of consruction, like all the numerous architectural members; it is like an intelligent enlargement of the pier; it takes seriously its functions as a support.

In Ile-de-France at the end of the 12 th century was frequently adopted the cylindrical column as a pier, not only around the sanctuary but also in the naves, perhaps because this form is that taking the least space, interferes with passage less than any other, and best shows the different internal p parts of the edifice. But the cylindrical column of a nave m must support:-- 1, two archivolts of the bays. 2, the transverse arch and the two diagonal arches of the side aisle; 3, t the cluster of little shafts rising to the springings of the great vaults. These complicated members intersect and each h has its function, requiring a broad bearing on which they can rest, and that could not be within the horizontal section of the cylinder, the circle, or even in the square in which that circle is inscribed.

At the cathedral of Paris, whose choir and nave are supported by cylindrical columns, the section of the column being a circle with centre at A (26), the beds of the imposts of the archivolts trace the horizontal projection B; those of the transverse arch of the side aisle and of the two diagonal arches the projections C D; finally the bases of the cluster of little columns rising to the great vaults have the projection E. What did the constructors do? They simply traced the abacus of the capital according to the square F G H I, that encloses

aisle of the last church. Whatever the beauty of the work of these sculptures, the Romanesque form remains master, even at the end of the 13 th century; it does not appear that this art can be transformed.

The architecture like the Romanesque soulpture of the Rhine cannot throw off their Carlovingian swaddling bands, they turn in the same circle until the moment when imported French arts come to take their places. This immobility or respect for traditions, if one prefers, exists in Normandy, though with less force. The form of the Norman capital, without sensible modification in the masses, persists until the time when the French style invades the province after the conquest by Philip August. The simple or divided cubical capital is also found in that p province; it is often decorated by painting, as may be seen still in the church of S. George of Boscherville and in that of the abbey of Jumieges. We even find these capitals in the Carlovingian parts of French churches of the East. The crypt of the church s. Leger of Soissons still contains a painted cubical capital, vere remarkable, and that appears to date f from the 10 th century. We give a copy of it. (25). The ornaments are white on a yellow ochre ground. The intersection of the cube with the sphere is traced by a light notched double line, as indicated by the profile on the axis A B, which gives that capital a peculiar appearance. This is not the pure Rhenish capital.

Of all the different Romanesque styles, whose variety is i infinite, and whose most prominent characteristics alone have been traced, a single one attained a transformation at the end of the 12 th century. this is the French style properly so c called, for the capitals naturally follow the programme of t the architecture. (Arts. Architecture, Cathedrale). The others lag along in the old paths, are lost or fall into puerile refinements. We are then going to be able to follow step by step the successive transformations of the French capital without digressions, as in the first part op this Article.

As we have shown, there always existed a marked difference in the composition of the Romanesque capitals belonging to i isolated cylindrical columns of considerable diameter, and t the capitals of little columns, or of engaged columns. Yet that difference is rather the result of a natural instinct of an

ribs serving as stems for the angle crockets and scrolled in order to present to the eye a stronger mass.

For every artist of taste, whatever the school to which he belongs, there is work worthy to serve as an example, as much by the manner in which it is designed as by its execution, s sober, refined and monumental.

The revolution wrought in the form and details of the capitals about the end of the 12 th century in the royal domain and the adjoining provinces, quickly attained its entire development, as we shall soon see; it was made less rapidly in Burgundy. Romanesque influence persisted longer there. In the e eastern provinces, on the banks of the Rhine and Moselle, the Romanesque capital was decorated by more delicate details, b but retained its primitive form. The Rhenish Romanesque capital is well known, it is a portion of a sphere placed on an astragal and intersected by a cube.

Fig. 22 will dispense with lengthy explanations on the subject of this singular form, that one finds in nearly all Germany, of which traces are found in certain edifices of the 10 th century in northeast Italy and in Lombardy. These capitals often have their flat faces decorated, either by paintings or by delicate carved and slightly projecting ornaments like a sort of engraving.

In the 12 th century, when all architectural profiles assumed greater delocacy, the cubical form of these capitals must seem rude; then these great capitals were divided into four parts of spheres together intersected by a cube as indicated in Fig. 23; when was ornamented each of their parts, that formed a sort of group of four combined capitals.

The nave of the church of Rosheim near Strasburg, which dates from the 12 th century, gives a beautiful example of this kind of capital.(24). It is evident that the ornamentation is merely an accessory on Rhenish capitals; it is scarcely more that a scarcely modeled engraving, that does not modify the geometrical outline of the top of the column; one feels Byzantine influence, for if he examines the capitals of S. Vitale of Ravenne and of S. Mark of Venice, he will recognize in these edifices most of these capitals belonging to the primitive construction, decorated only by very flat sculpture, carved or even sometimes with colored inlays, as in the north side

different diameters; yet all the capitals in the same course are of equal height, whether they belong to large or small c columns. The bell of the capital of the thin column is surrounded by leaves little recurved at their ends, while already the capital of the thick column has the tops of its leaves s strongly recurved, at each end being a mass large enough to catch the light, thus causing to predominate in the midst of the foliage certain strongly accented masses. Indeed on the great capitals is seen to develop first those ends of leaves, which gradually assume great importance, until they represent those groups or bunches of leaflets, that are now termed crockets.

The strong square abacus of Romanesque capitals are still r retained in the architecture of the 12 th century, supporting the imposts of arches with beds themselves inscribed in right angles, compelling the sculptors to give to the angles of the capital great strength to not be broken under the load. These scrolled leaves are not hollowed like the volutes of the antique Corinthian capital, which support nothing, but are solid and form a corbel necessary for strength. That is why we see these recurved leaves adopted at first on the great capitals supporting the principal arches, while they do not seem necessary on the more slender capitals, that only have to support pointed arches. For the stronger reason a very great development is given to the angles of the capitals of isolated columns supporting very heavy loads and transferring that weight to a comparatively slender shaft.

It is much emphasized in the capitals of the cylindrical columns around the choir of church Sa Denis, although there again one feels the influence of Romanesque sculpture. The development is complete in the capitals of the sanctuary of the church of S. Leu of Esserent. (21). We have no need to e emphasize the beautiful qualities of this last sculpture, which sometimes has a high degree of refinement and strength. In this example are no confusion and no experiments. The angles of the thick abacus are powerfully supported by the great crockets, designed with infinite art; between them appears the circular bell forming the basis of the capital; heads of animals projecting from the junctions of the large separated leaves occupy and decorate the middle part. The leaves have two

the capitals deposited in the Museum at Toulouse and said to come from the cloister of S. Sernin (12 th century) are so composed.

We give (19) a copy of one of them. It represents a bear h hunt in the middle of a scroll of exquisite taste. The bear is remarkably imitated, contrary to the custom of the sculptors of the 12 th century, who nearly always give their animals a conventional form; it is seen that the vicinity of the Pyrenees has allowed the artist to take nature as a fact. As for the capitals of the cloister of Moissac, they represent various scenes, whose little figures are carved with the greatest delicacy, or ornaments in the style of those of the capitals of S. Sernin.(Fig. 13).

But in the siuthern provinces the school of sculptors, that had attained such rare skill in the 12 th century, became extinct during the wars of the Albigenses, and we must return to the North to find the transition from the Romanesque capital to the capital belonging to the pointed style. That transformation follows step by step that of the architecture; even because of that, it is very interesting to study. In the northern provinces, and particularly in the royal domain, sculpture in the 12 th century had reached a perfection of execution scarcely inferior to the southern schools. Yet in the capitals of that epoch and belonging to the edifices of those p provinces, figures are rare and ornamentation dominates, composed of foliage or scrolls. The influence of the antique Corinthian capital often makes itself felt, but it is already s subjected to special forms; it is rather a memory than an imitation. The artist adopts the outline and certain arrangemeents of the masses, that appeartain to it; he does not experiment but has found a type, to which he becomes more and more subject till the time, when he will completely abandon the la last tracees of Romanesque art. The transition from the Romanesque capital, more or less faithfully inspired by antique tradition, to the capital belonging to pointed art, may be observed in a great number of edifices erected during the first half of the 12 th century.

We will take as an example in the church S. Madeleine of C Chateaudun (20), among many others analogous. The piers of th the nave of that church (north side) have engaged columns of

of damascening. The church S. Sernin of Toulousesupplies beautiful specimens of these, executed with rare perfection.

Here (18) is one of those capitals. In the same monument are others, that give only a sketch of this rich ornamentation; some are placed on the cylindrical columns of the sanctuary and are quite faithful copies of Romanxxxxx capitals, copies however in which one finds a style, taste and purity of execution, that render these sculptures superior to the capitals of the late empire.

It is a fact that we must mention, for it is peculiar to t the church S. Sernin as well as to certain southern churches of the 12 th century, that in the interiors of these edifices the capitals are only decorated by leaves with rare exceptions, while those decorating the portals on the exterior are almost all covered by legendary or symbolical figures or eccentric animals. The columns of the portal opening at the end of the south transept of church S. Sernin are surmounted by capitals on which are represented the personification of the vices and their punishment. The portal of the nave on the same side reproduces on its capitals the annunciation, visitation, massacre of the innocents, etc. This method of representing scenes from the Old and New Testaments on the capitals of portals is generally a adopted in the 12 th century, not only in the South, but also in some of our churches in the North. The royal portal of the cathedral of Chartres, for example, develops on its capitals a series of sacred scenes, that follow each other and form a kind of frieze covering the recesses produced by the arrangement of the columns, stepped behind each other.

But particularly in the cloisters in the 12 th century, the capitals are covered by scenes taken from sacred history or the legends of the saints. The cloisters of S. Trophime of A Arles, Moissac, Elne, are especially rich in representations of this kind, as well as the admirable cloisters of the churches of Toulouse and Avignon, now destroyed. The museums of those cities still contain some of those fragments of the greatest beauty and incomparable refinement in execution. The capitals of the Romanesque cloisters are nearly all double; the columns supporting the arcades of the galleries are twin; and in that case these capitals not only have a sculptured frieze supported by a row of leaves above each astragal. Some of

an arrangementof the little columns entirely Romanesque causi - ng the adoption of the Romanesque capital in which the antique traditions are no longer apparent.

We repeat that during the second half of the 12 th century these different influences acted at Langres. But it was necessary for this tradition of the antique form to be very strong in that country, since during the last years of the 12 th or the first of the 13 th century, when the nave of the cathedral was constructed, retaining the antique pilasters engaged in the piers, one still sees in the composition of the capitals of these pilasters the Corinthian arrangegent retained in certain details and ornaments belonging to the most beautiful a and most characteristic sculpture of the first pointed period.

Thus we find (16) in the same capital in mas the divisions of the leaves in the Corinthian bell, the remains of the volutes with their scrolls and rings, they the recurves and a b beautiful crocket frankly belonging to the sculpture of the first years of the 13 th century.

Another capital from the same nave with a stronger but still persistent memory of the Corinthian capital, presents details, that although very singular, are impressed with the style of the first years of the 13 th century; on thi capital the recurved leaves cover the human heads.(17).

Burgundy presents to us some other examples of capitals of that epoch decorated by heads as crockets; we have seen one in a little church of S. Sabine between S. Thiebaut and Arnay-le-Duc. Normandy and Maine also possess a very great number of them, but of an earlier date.

Any other epoch of our architecture does not furnish such a great quantity of capitals of varied forms and details as the 12 th century. At no epoch also, the sculpture of this important member of the column was executed with no greater love. We can only give some well characterized types in small number, while attempting to classify them methodically.

Since we are at the interpretation more or less exact of antique form, we cannot pass over in silence these capitals from the banks of the upper Garonne, that have a very definite appearance, and that while retaining nearly the masses of the Corinthian capital, subdivide the great leaves into graceful leaflets enclosed in scrolls near each other like a sort

to capitals during the 12 th century, as shown by Fig. 14, reproducing a capital of the old Romanesque cloister of the abbey of Vezelay.[1] It is unnecessary to recognize, that even in provinces where Gallo-Roman tradition permits, especially because of the vicinity of antique fragments covering the soil, that influence affects only capitals placed on cylindrical columns like the antique columns, and on pilasters arranged like antique pilasters. On engaged columns, those at angles and l little columns, the Romanesque capital takes its place, as if these kinds of supports belonged exclusively to that style a and could admit no mixture. That is very visible in the cathedral of Langres.

Note 1. p. 495. This capital is the only one of this cloister preserved intact. It is deposited in the museum of the church, and reproduced in the new construction of the cloister.

That monument presents in the interior and on the exterior only the cylindrical columns of the choir, that we have just mentioned, and pilasters. The capitals of these columns and pilasters recall more or less faithfully the sculpture and co composition of Roman Corinthian capitals. But the triforium of the choir presents a series of arcades separated by little coupled columns. These little columns are surmounted by twin capitals forming the imposts of the little archivolts. That is an arrangement entirely Romanesque, now these twin capitals of coupled little columns mostly have a character foreign to the antique arts; this may be judged by the example givey here. (15). The wall supporting the triforium of the choir of the cathedral of Langres is thick; to support it without having columns of great miameter, the architect had to space apart the little columns according to the section of the wall; desiring also that the twin capitals should be made of a single stone, so as not to givee too much separation to his columns, he has reunited them by a great lion's head, as shown by our figure.

An analogous procedure was followed in cutting the twin bases of these little columns, that are also separate in a single block of stone.(Art. Base, Fig. 19). Thus on the one hand we see the primitive form of the column or of antique pilaster causing the retention at Langres of the form and composition of the Corinthian capital; and on the other the adoption of

We have stated that after Merovingian times, the capitals directly support the imposts of arches and are no longer destined to support lintels, as in the antique Greek and Roman architecture. But to this rule there are exceptions, however general it may be.

In the central provinces, Auvergne, Poitou and Aquitaine, from the 11 th century one frequently meets with columns taking the place of buttresses on the external walls of apses or circular chapels.(Art. Chapelle, Figs. 27, 34). The capitals then directly support the cornice under the roof, the intervals between these capitals being relieved by corbels. Beautiful examples of these capitals are found around the apses of the chuhcres of Issoire, S. Nectaire, Chamailleres, Notre Dame-du-Port at Clermont (13), which date from the 11 th centurw; we shall find them also at Mas-d'Agenais, on the banks of the Garonne, at S. Sernin of Toulouse, the cathedral of Agen, and even at the S. Papoul on the borders of Roussillon. In that case the cornice is merely a simple slab destined to receive the first slabs of the roof and to protect the walls by its projection. The antique influence is still felt in the capital (Fig. 13) of one of the chapels of Notre Dame-du-Port; but these reminiscences are little common, and the capitals belonging to this style and to the architecture of the 11 th and 12 th centuries in these provinces have an original character.

To meet again wit these capitals in whose composition Gallo-Roman traditions have great influence until the beginning of the 13 th century, it is necessary to go into certain localities of the East and West, to Autun, Langres, along the Saone and Rhone. The capitals of the cylindrical columns of the sanctuary of the cathedral of Langres, which date from the second half of the 12 th century, are evidently imitated from the Gallo-Roman Corinthian capitals; one even finds there the making of the sculpture, the numerous drill holes made to indicate the separation of the members of the leaves, the toothed outlines of the leaves, volutes, scrolls, etc., the curvilinear abacus with its four flowers and the Corinthian bell. Frequently beside these capitals imitated from antiquity the special taste of the epoch appeared, and the Corinthian foliage is replaced by figures, as at the cathedral of Autun, by interlacings or rosettes, a kind of ornament frequently adapted

such capitals in provinces favored by nature of the materials, that may pass for a work designed to be seen closely as if it were furniture. Examples abound; we shall choose one among all taken from the ruins of the church of Deols near Chateauroux. (1). This capital is low, compared with those of Burgundy of the same epoch; its abacus is thin and projects little, the ornaments being executed with remarkable delicacy; it presents a singular combination of men and animals, that one finds so frequently in the provinces adjoining the Loire and even in Angoumois. This is no longer the imposing art of Burgundy, the bold outlines of the porch of Vezelay, contemporaneous with the church of Deols. The sculpture is not undercut but is much modeled; antique traditions do not seem to have dominated the artist, who seems rather inspired by the designs of fabrics, ivories and jewels brought from the East so greatly prized in the 12 th century. (Art. Sculpture).

But it is particularly in the southern provinces comprised between the Garonne, the Loire and the sea, that from the 11 th century the capitals are covered by animals treated with rare energy, simply modeled, with a strange character full of style. One will judge by the example given,(12) taken from a capital of the porch of the church of Moissac. (Partly of the 11 th century). This sculpture is designed with vigor, cut in a hard stone by a skilful hand, but is not without refinement; the clearness of the composition, the free arrangement of the masses, do not exclude delicacy of details, as our engraving shows as much as possible. The junctions and movements of those fantastic lions having one head and two bodies are true; well understood in the sense of monumental decoration; the sculpture projects little in order to not injure the contour of the capital, whose form is squat, like those of all capitals of great columns. For from the Romanesque epoch a fact is to be noted, that the height of courses determining the height of the capital, it results that in some edifices the capitals of the great columns are low, wide and stumpy, while those of the little columns are slender and high. It is unnecessary to believe, that this principle is adopted in absolute fashion, but it always has an influence on the proportions of capitals, which are more elongated in proportion to the diameter of the columns, the smaller these are.

interiors of the monuments were numerous spaces to fill, destined to attract attention and instruct the multitude. The c capitals with figures essentially belong to Romanesque architecture, particularly in the provinces distant from Ile-de-France. They persist until about the end of the 12 th century in Poitou, Berry, Burgundy, Aquitaine and Auvergne, while foliage and interlacings are adopted by preference in the provinces dependent on the royal domain. We only find those great capitals with a very projecting abacus and broad sculpture at Vezelay, and in the vilinity of that celebrated abbey. Elsewhere during the 11 th and 12 th centuries they are more squat, projecting less from the column, lower and are not crowned by an enormou abacus with such monumental effect. At Vezelay the capitals of the engaged columns of the side aisles have a height, including the abacus, of one quarter of the height of t the shaft, while generally in Auvergne and Berry, they have scarcely the fifth or sixth of the height of the shaft. In Normandy, Maine, Anjou and Poitou, they are still lower with regard to the length of the column.

The dimensions of the materials employed were for something in these differences of proportions. In Burgundy the layers of stone are thick, and have always been quarried in blocks of great dimensions, while in the provinces just mentioned, from time immemorial stone was taken from beds of small thickness. Now during the Romanesque period, capitals are always carved in the height of a course; a bed joint never divides them into two courses. The capitals being cut and finished b before setting, like all architectural members, it would have been impossible to harmonize sculptures made on two stones. It was only later, that the capitals were composed of two or three courses, and we shall see how the stonecutters proceeded to assemble these different blocks finished on the yard. It is unnecessary to state, that if the height of the limestone beds influenced the proportions given to the capitals, the q quality of the stone during the entire Renaissance period came to the aid of the sculptur, if fine-grained and compact, but injured his work if coarse and porous. Where the materials a allowed great delicacy in carving, the capitals are sculptured with rare perfection; they are covered with details scarcely visible at the distance at which they are placed. There are

Some represent scenes from the Old Testament; for example the blessing of Jacob, the death of Absalom, David and Goliath, Moses descending from Sinai.(8). This capital is one of those treated with most energy; its abacus is decorated by large b buttons with borders, that recall the antique eggs. The demon escapes from the mouth of the golden ox at the right of Moses, and a man brings a kid for sacrifice to the idol and seems a amazed. The gestures are good, properly felt and strongly accented, the figure of the demon has a wild energy not wanting in style. In brief, if the details of these sculptures are often barbarous, one can never reproach them with vulgarity. In these compositions is always something grand, true and dramatic, that captures the attention and causes thought. Many of these capitals represent parables; the bad rich man, the prodigal son, legends, that of Cain killed by his son Tubal, and of S. Eustache; scenes from the lives of S. Antoine and of S. Benedict; then the vices and their punishment (the devil plays a great part in these compositions); the labors of the year; the grinding of grain, the vintage, etc.; odd animals taken f from the animal books (9); lions and birds back to back or f facing in the midst of the foliage. All these ornaments and figures are collected on the same surface, composed of a reversed frustum of a cone intersected by a cube giving in horizontal projection the trace - and in vertical projection the trace B.(10). The astragal always continues at the base, and the second projecting abacus is taken in another course; besides all the abacuses are varied in profile or decoration. If these capitals with figures in the nave of Vezelay are in a rather wild style, not so are those composed only of foliage; the latter have a purity of execution and incomparable beauty.

But it is especially during the 12 th century, that the sculpture of capitals attains singular perfection. Their function is henceforth decided, supports before being ornaments, they retain that dominant form while covering themselves with the richest, most delicate and varied ornamentation. For a l long time already it had been admitted, that the capitals of the same monument must all be varied, while constructed within a uniform outline; for the rculptors there was an opportunity for excelling each other, for giving proofs of talent in composition, refinement of execution, patience and care. In the

designed to fulfil a new and useful function. That is particularly apparent in the edifices of Auvergne, Nivernais and Burgundy, which date from that epoch. In those provinces the archivolts present a square section, that requires a solid point of support; the capital is then furnished with a double abacus, the first belonging to the same course as the capital, and the second forming a projecting slab; now this first abacus comprises exactly the surface given by the impost.

Fig. 6, copied from one of the capitals around the choir of church S. Etienne of Nevers (second half of 11 th century), will illustrate the useful role of the Romanesque capital.

In Ile-de-France and Normandy, indecision lasted longer; t the archivolts frequently have large rounds, are meagre, and do not frankly rest on the projection of the capit.l. That is apparent in the nave of the cathedral of Evreux, where some piers of the 11 th century have retained their capitals and primitive archivolts, and present to us an arrangement reproduced here. (7).

It is always in the vicinity of the great monastic centres, that it is necessary to study Romanesque architecture, for it there develops with most vigor and freedom. In Burgundy the o order of Cluny forms a school in the 11 th century comparable to no other, it is then from it we shall demand the most beautiful examples of thi: epoch. This is at Vezelay, since the mother church of Cluny is now destroyed. The nave of the church S. Madeleine of Vezelay presents a series of 94 capitals decorated by ornaments and figures; their countours, proportions and the monumental mode of treating the sculpture are a rich subject of studies to which one always returns after having examined other edifices of the same time. Among these c capitals are noted some around the transepts, that belong to an earlier epoch and were replaced in the construction of the nave at the end of the 11 th century. It does not appear that the master of the work followed a methodical order in classifying these capitals; being all cut and sculptured in the same manner, as usual before setting, it is probable that the setters placed and fixed them without following any order, but j just as they left the hands of the sculptors. Besides the foliage capitals without signification, there is a great number among them with figures, which it is difficult for us to explain.

The crypt of church S. Etienne of Auxerre presents these t two examples, that date from the same epoch.(9 th or 10 th c- century).

Fig. 4 bis is the prespective of the plan 4, and Fig. 5 is the capital of the isolated column. It is seen that if the c capital of the angle column bears an impost projecting beyond the face of the column, it is not yet the same for the detached column. There the capitals, Figs.3, 4 bis and 5,show how t the Carlovingian sculpturs interpreted the foliage of the Roman capital; some not knowing how to reserve and disengage in the stone the back of the leaf placed it in outline, as if f fastened on the bell; others contented themselves with some grooves cut fan-shaped to imitate the ribs and hollows of the Roman foliage. These primitive artists however, sometimes attempted to abandon antique tradition, and already from the 10 th century cut figures on the bells of their capitals, or forms whose origin could be discovered with difficulty, lines, zigzags and rude faces, also frequently contented themselves with paneling them. But we do not wish to weary our readers by reproductions of these primary and formless attempts, which only attract curiosity; we shall arrive at the 11 th century, an epoch during which the form of the capitals, their function, and their sculpture can be perfectly defined.

It is first necessary for us from that epoch to distinguish the capitals of isolated cylindrical and engaged columns.

In churches the cylindrical columns are usually reserved to around the sanctuaries; everywhere else the column is engaged in a pier, pilaster or wall, for at least one third. The function of the engaged column being in the interior of monuments to support an archivolt, and its diameter rarely exceeding 1.1 to 1.3 ft. (art. Colonne), it was necessary to enlarge the capital very considerable to receive the bed of the impost of t that archivolt, which must sustain a thick wall, or at least a buttress. From the moment that the system of construction of Romanesque vaults was adopted, the capital was no longer a mere ornament, it entered into the construction as one of the most important parts, since it became the bearing, the s starting point of the vaults.(Arts. Construction, Pile). Then after these experiments and rude attempts of architects and sculpturs, we see abruptly in the 11 th century the capital

the Parthenon, the caused the architrave to project beyond the face of the column as indicated by Fig. 2. The function of t the capital is well marked there; it is a corbelling placed on the cylindrical shaft of the column to give a wide bearing for the lintel. These refinements escaped the Romans; they s saw in the capital only a simple ornament, and did not profit by its enlargement to support a lintel wider than the upper diameter of the shaft of the column.

From the earliest tome of the middle ages the entablature entirely disappeared, to reappear only in the 16 th century, and the capital with its abacus bore the archivolt without an intermediary. Then the capital takes a useful part; from the cylinder it passes to the square by a corbelling, and receives the impost of the arch; this role it retained until the epoch of the Renaissance. Yet until the 11 th century in setting the impost of an arch on the abacus of the capital, men dared not always to profit by the enlargement produced by the projection of this abacus, and the bed of the impost was kept over the face of the column. Thus were arranged the capitals of the nave of church S. Menoux, that dates from the 9 th or 10 th century.(3). It was only successively that men came to use the enlargement of the capital as a corbelling to be utilized for supporting an impost, whose bed projected beyond the diameter of the column. We shall see the important consequences of this innovation in the construction of edifices, and how the capital must gradually abandon the antique form, to lend itself to this function imposed by the architectural priuciples of the middle ages. In Merovingian and Carlovingian edifices the columns were often placed in projecting angles, as indicated by Fig. 4, to relieve and ornament these angles; if a tunnel vault rested on the wall A B, the capital of the column formed a support for the head of the vault and came flush with the face A B as in the dotted line B B'C; the abacus alone projected beyond the face of the wall. In this position we see the first capitals support masonry by corbelling; for in the same edifice detached columns bear the imposts of archivolts, whose bed is exactly inscribed within the upper diameter of the shaft, while the angle columns are already surmounted by columns, whose enlargement as in Fig. 4 serves to support a projecting impost.

diameter and height ranged well or badly in the same monument. The old basilicas of Rome are themselves only a collection of antique fragments. This variety of ornamentation, imposed by necessity, was the cause that the eyes became accustomed to see in the same edifice capitals, very different in design, age, style and origin. When the antique fragments were wanting, it was necessary to supplement them by new works, and fr from the 6 th to the 9 th centuries, sculptors sought to imitate the old Roman ruins under their eyes. These imitations were made by unskilful hands with rude tools, without any idea of a regular fitness, were only formless reminisoences of antique arts, in which one vainly seeks the rules and principles of art. However, it is necessary to recognize, that from that distant epoch was made an actual revolution in the manner of using the capital: this member of the column received a d destination more correct than that made by the Greeks and Romans.

Certain explanations are necessary to make understood the entire importance of this change of destination given to the capital.

As well known, the Grecian orders are composed of the column with its capital supporting the entablature, or otherwise stated, superposed lintels forming the architrave, frieze and c cornice. It is the same with the Roman orders. Before the last years of the late empire, no Greek or Roman columns were without the entablature, aud it was only very late in some edifices of the dacadence, that one sees exceptionally the Roman a archivolt placed on the capital without entablature. In the Greek and Roman orders the capital is rather a stop to satisfy the eye, than an appendage necessary to the stability of t the edifice, for the first lintel does not exceed the vertical from the upper diameter of the column, and the capital is thus a useless member (from the point of view of stability), whose strong projection supports nothing on two of its sides.

Fig. 1 gives a capital from one of the temples of Agrigentum with its entablature, and clearly expresses what we wish to indicate. Assuming the parts A of the capital as cut off, the architrave will support all just as well on the shaft of the column. As people of sense and taste, the Athenians were evidently struck by this defect, for in the construction of

by the architects of Amiens and of Cologne, for it serves as a transition between the great lower buttress and the upper serving as abutment to the flying buttress; and further it makes the maintenance easy, as well as the cleaning of the gargoyles. The chapels of the chevet of the cathedral of Limoges rested on an enormous substructure of granite, that contained their bases in its mass. From that moment (the last years of the 13 th century) one no longer sees particular arrangements made for the construction of apsidal chapels, the same course is pursued by architects until the 16 th century in regard to the entirety, and the differences that can be found between the chapels of the 15 th and those of the 13 th centuries only refer to the architectural details, that are modified.

We then terminate here this Article, since we shall have in the course of the Dictionary occasion to return to each of t these details.

CHAPITEAU. Capital. Cap.

Name given to the enlargement forming the upper part of a column or pilaster, and serving as a transition between the support and the supported.

After the imperial epoch the Romans only employed the Corinthian order in their edifices, with rare exceptions. Richer t than the others, lending itself to great dimensions of the m monuments, it suited Roman taste and programmes. But in the l last times of decadence, sculpturs had come to strangely pervert the forms of the antique capitals. From Ionic and Corinthian capitals had been made a combination, that it is agreed to call the Composite capital, but which in fact is only a v very ungraceful mixture to two elements intended to remain s separate. Already the Romans had even introduced in the composite capital figures, winged victories and eagles; they had loaded the abacus with ornaments, and sought in that important part of the architectural decoration richness rather than purity of line, so well understood by the Greeks. When in Gaul under the Merovingian kings, it was desired to erect new edifices on the ruins covering the ground, materials were not lacking; sculpture was a lost art, then they employed all the o old fragments, that could be collected, in the construction of the new buildings. Columns and capitals differing in diam-

plate and corbels destined to support the ridges of the shed roof of carpentry, that was projected for the side aisle. At Limoges recent restorations have removed similar traces, whose importance was not understood from the archaeological point of view. These arrangements evidently indicate, that in the 13 th century men did not think of erecting polygonal apsidal chapels without pyramidal roofs, and that these stone slabs were merely a temporary covering intended to furnish a place for the diagrams during the construction of the upper parts, and at the same time protecting the vaults until the time, when the work being finished, the permanent roofs could be established. The polygonal form of the chevet chapels adopted from the 13 th century until the 16 th required a pyramidal covering, and the architects of that time had too just an appreciation of the effect of architecture, to not be shocked by the absence of that indispensable crowning; for it is a general principle in pointed architecture, that each portion of a monument must bear its own covering, however little it is detached from the mass. We are indeed willing to admit, that at the cathedral of Narbonne they never thought of covering the apsidal chapels otherwise than by a platform of stone slabs, but these chapels were crowned by battlements instead of a balustrade. The cathedral of Narbonne was almost a fortress at the same time as a church, and in that case the platforms were justified; it is an exception. As for the apsidal chapels of the cathedral of Limoges, the absence of the pyramidal roofs contrasts with their design, that exclusively belongs to the northern school of architecture. One of these chapels, that of the chevet (Fig. 41) presents a peculiarity, rare even in the 14 th century, that the windows are crowned bn perforated gables; now that part of the cathedral of Limoges dates from the end of the 13 th century. For the rest of the composition of the chevet chapel of the cathedral of Limoges, one again finds the elements supplied by Amiens, Beauvais and Cologne.

Fig. 41 will show the relationship existing between these monuments. But besides the exceptional perforated gables at Limoges as at Clermont, the balustrade of the apsidal chapels passes before the great separating buttresses, and one can r regret that this arrangement had not been previously adopted

buttress, at Cologne a single gargoyle at the height of the cornice with leaves below the crown moulding fulfils that office. At Amiens the balustrade rebuilt in the 16 th century must recall the balustrade of the S. Chapelle of Paris, we b believe; at Cologne the balustrade is similar to that of Beauvais. There remain the summits of the buttresses, incomplete or unfinished at Amiens, completed at Cologne some years after the construction of the chapels, about the beginning of t the 14 th century, by high open pinnacles containing containing statues. In both these cathedrals, the apsidal chapels are covered by isolated pyramidal roofs of carpentry. At Beauvais the coverings of the chapels were of stone slabs; but it should not be forgotten, that in the latter monument there is a double triforium, and that the architect desired to leave to that beautiful arrangement all its importance on the exterior, and to not mask it by the roofs.

Note 1. p. 477. Under the Art. Cathedrale see the history of the construction of the cathedral of Amiens. Scarcely were the chapels of the apse completed, when the work was suspended, and was only resumed after the fire in the lower roofs.

At Clermont in Auvergne, Limoges and Narbonne, later at Evreux, apsidal chapels were protected by stone slabs forming a single slope and very slight, with that established on the side aisle; but we cannot regard that mode of covering as definitive. it will be easy to demonstrate it. At Clermont, Limoges and Narbonne, these roofs without drops but nearly plane, are covered by diagrams traced on the stone as on a floor. These diagrams are naturally those of the structures later t than the erection of these chapels; they are traces of flying buttresses, portals of transepts, of high windows. In cities of the middle ages, space was lacking for establishing workyards with all their accessories. As soon as the chapels and side aisles were completed, they were covered by a surface of stone slabs, and this surface served as a place for the stonecutters to trace their diagrams; they made them with the greatest care, since again today we can accuratelw measure and d draw them on the board. Now at Clermont, although there is a stone roof, one sees all around it the ends of the flying buttresses piercing the area and gutters arranged for receiving the roofs; better, the wall of the triforium bears the roof

for their stability; they are as simply conceived as elegant in appeasance.

We give (38) the plan of one of these chapels taken at the level of the windows, (39) the internal view, and (40) an external view. Three great stained glass windows, that have no less than 46 ft. in height, and the lower arcade with its piscina form the entire decoration of the interior; the windows as at the S. Chapelle of Paris occupy the entire space between that arcade, the piers and the vaults, for which their archivolts serve as side arches. On the exterior a beautiful cornice with crockets and leaves crowns them, the buttresses with external projection receive the archivolts covering the windows, and whose thickness bears the upper gutter. The base of the carpentry rests directly on the side arches of the vaults. It is impossible to imagine vaulted construction simpler and wiser. The summits of the buttresses are abruptly terminated by slopes on which rest animals, horses, griffins and dragons. On the chapelcf the Virgin these animals are replaced by kings of Judah.(Art. Amortissement). We do not think that this crowning is complete, for one perceives at the summits of the buttresses changes, as if recat, negligences that mark a certain haste to finish good or bad, and that does not correspond to the careful and exact construction up to and comprising the cornice. What confirms us in that opinion that the caps of the buttresses of the cathedral of Amiens [1] were not completed as projected, or that the fire destroyed their caps before the erection of the upper part of the choir having calcined them, they were rebuilt with parsimony and in haste, is that especially at Beauvais and particularly at the cathedral of Cologne, the chapels copied from these of Amiens bear very high pinnacles, whose slender proportions form an indispensable complement for these projecting and thin buttresses and ensure their perfect stability by their weight. It is interesting to compare these two edifices, Amiens and Cologne, that have such intimate relations with each other. The apsidal chapels of Cologne, like those of Amiens, rest on a circular p platform that circumscribes them and serves as base for the entire chevet; their proportions are similar, the tracery of the windows being identical. At Amiens two gargoyles at the height of the crown moulding discharge the water at each but-

on the side arch, that separates it from the opening. Fig. 36 giving the internal view of one of these chapels will dispense with lengthy explanations of this subject; it shows the p passage made above the arcade and the entire internal arrangement. The proportions of these chapels are most happy; their appearance is stable, the details of the sculpture and the mouldings are treated with rare perfection. On the exterior these chapels are no less beautiful and simple, and if the u unfortunate open gallery had not been placed on the upper cornice about the middle of the 13 th century, whose least inconvenience is to make these chapels appear small, one could present them as a perfect and complete model of primitive pointed architecture. Fig. 37 reproduces their external appearance. Rising to the upper level of the side aisle, they are covered by carpentry forming isolated pyramidal roofs covered w with lead. Between these roofs and the shed roof covering the side aisle is a beautiful gutter of stone placed on the transverse arches at the entrances of the chapels, discharging the water through the sepatate great buttresses by channels, that a man can enter erect, and gargoyles. This principal channel is intersected by another channel of equal height, receiving the water from the gutters set on the cornice crowning the chapels.

Note 1. p. 470. At the scale of 1:20.

In spite of the fact that the apsidal chapels of the cathedral of Rheims may be very well composed, they have not yet entirely abandoned the Romanesque traditions; the trace of it is found in the circular substructure, the piers projecting inside, the horizontal band crossing the arcade anf intersecting the little columns, and in the construction, that is a l little heavy. If we desire to see apsidal chapels of the pointed period after attaining their complete development, it is necessary to transport ourselves to the cathedral of Amiens; these are so much more interisting to study, because they have served as types for all structures erected later, among others for the chapels of the cathedrals of Beauvais, Cologne, Nevers, Seez, and later of Clermont, Limoges, Narbonne, the church of S. Omer of Rouen, etc. The apsidal chapels of the cathedral of Amiens are high, widely opened and lighted; their construction only comprises just the volume of materials necessary

pointed school recognized; 1, that archivolts of windows pierced in a cylindrical wall thrus outwards; 2, that the tracery could only be solidly established when in a plane; that cutting in a curved surface presented insurmountable difficulties. Thus in adapting tracery as the window sash and to maintain the glass, they found themselves compelled to abandon the cylindrical form in little apses as well as in great apses. But the junction of the tracery with the circular slopes of the s substructure required complex penetrations, a joining presenting certain difficulties, they soon found it more natural to extend the polygonal form to the ground. To summarize, the c custom of the Romanesque structures caused the beginning of c chapels on a circular plan in the 13 th century; the principle of construction adopted caused the renunciation of the circular plan in constructing windows, particularly when filled by tracery; this principle being once adopted caused the abandonment of the cylindrical form, even for substructures, and required the polygonal or prismatic form in plans of chapels. Thus in the entire pointed system were imperative requirements, that forced the architects from inferance to inference, to apply it with more rigor, whatever the force of earlier traditions. However at Rheims the architect knew how to skilfully extricate himself from the bad step made in founding the chapels on the circular plan; but the attempt to harmonize the two systems was scarcely renewed afterwards; there was evidently formed what we call a school.[1]

Note 1. p. 470. The chapels of the chevet of the cathedral of Tours are similarly prismatic on a circular base.

We give (34) the lower plan of one of the apsidal chapels of the cathedral of Rheims,[2] and (35) the plan at the level of the windows, which indicates the tracery penetrating the conical slope crowning the substructure externally. According to the method of Champagne, there exists a passage above the substructure decorated by an arcade in the interior. The windows then open into a recess produced by the internal projection of the piers, as at S. Remy, the chapel of the archbishop's palace at Rheims, the chapel of the castle of S. Germain-en-Laye. Yet at Rheims is not found the side arch detached from the window by a ceiling bearing the gutter (which is further a Burgundian arrangement); it is a concentric splay

to the side aisles so that their vaults may be inscribed in a circle. Thus at S. Remy of Rheims (33 bis),[1] the apsidal c chapels are perfectly circular, vaulted by means of four pointed arches, five side arches and four transverse arches open to the side aisle. Two columns A A separate the chapel from the side aisle and complete the eight points of support on w which rest the four diagonal arches. These chapels permit to be seen externally only a circular arc of very small extent, because of the projection of the great buttresses separating them and designed to abut the flying buttresses of the upper vaults. On the axis a much deeper chapel B terminates the chevet. Above the arcade decorating the interior of the substructure of these chapels extends a passage through the piers supporting the arches; the windows occupy all the space left between these piers and are terminated at top by pointed vaults concentric with the side arches. The vaults are abutted by p piers forming buttresses inside. At Chalons-sur-Marne the chapels present on the exterior buttresses, that are merely a f fluted half column terminated by a statue and a canopy.(Art. Contrefort). This circular plan, the piers forming internal buttresses, the two columns placed at the entrance of the chapel next the side aisle, and even the external fluted half c columns, are arrangements recalling again antique Roman architecture. Its influence is particularly apparent in upper Marne at Langres and along the Saone, also making itself felt at Rheims (a city still possessing an antique monument), and even to Chalons, during the first years of the 13 th century. The apsidal chapels of the cathedral of Rheims were erected 20 or 25 years after those of the church of S. Remy, and were evidently derived from the latter. But at the cathedral of Rheims, Robert of Coucy supported the detached columns at the entrance, and gave his plan more amplitude.

Note 1. p. 466. These coverings were later replaced by very much higher stone pyramids, that do not have a happy effect.

Note 1. p. 468. Plan at the scale of 1:20.

The apsidal chapels of the cathedral of Rheims merit being studied with care. Commenced on a circular plan, like those of S. Remy, they become polygonal at the level of the window sills, this is the transition between the two Romanesque and pointed systems. Architects subject to the principles of the

what is the apsidal chapel in the Romanesque of the West. At Saintes exists a charming church of the 12 th century, S. Euthrope, which possesses a vast crypt, or rather a lower church on the ground floor under the choir. The apse of this church is flanked by three chapels whose external appearance we reproduce. These chapels extend in the crypt as at the level of the choir, as shown by our engraving, their windows are not of the same dimensions as those of the side aisle A; they are smaller. The chapels of S. Euthrope of Saintes then, as we h have said, are small structures attached to a larger one. If this system can be adopted in the Romanesque architecture of the West, whose scale is not subject to fixed proportions, t that takes no account of unity in its architectural arrangement, it could not have been accepted by the architects of t the provinces of the North at the end of the 12 th century, when architecture no longer allowed these discords in scale, and men returned to the imperious laws of unity. Besides in the North they had not that resource of high side aisles; it was necessary to keep them low to be able to fully light the central nave above their covering. Therefore when at the beginning of the 13 th century they desired to open the chapels to the apse of the church, it was necessary to give them the height of the side aisles and to cover them without too many difficulties, without interfering with the discharge of the water and without injuring the general appearance. They proceeded timidly at first; for example at Bourges the apsidal chapels only formed semicircles attached to the side aisle a and covered by conical terraces of stone slabs.[1] At Chartres the apsidal chapels were also merely niches crowned by pavilions of stone slabs. In Champagne the apsidal chapels from the end of the 12 th century appeared to take a considerable development. The choir of the church S. Remy of Rheims is c contemporary with that of the cathedral of Paris, i.e., it must have been built about 1180, there is evey a very great analogy between the two edifices. Yet the double side aisles of the choir of Notre Dame of Paris had no chapels, or possessed only very small ones, while at S. Remy of Rheims appears around the apse an arrangement peculiar to Champagne, one that we find reduced in the chapels around the choir of Notre Dame of Chalons-sur-Marne, and that consists in opening the chapels

choir of S. Martin-des-Champs of Paris, in the choir of the church of Vezelay, where the coverings of the circular chapels, instead of being conical, form twisted surfaces only possible to obtain by a mass placed on the vaults . In the churches of Poitou of Aquitaine, the apsidal chapels being lower than the side aisles, the coverings naturally abut against the wall of that side aisle beneath its cornice, but in the East and North, men desired early to give to the absidal chapels the height of the side aisle, and the constructors after leveling the c cornices, knew not how to cover these irregular surfaces, and recoiled before the difficulties presented by the intersections of the carpentry roofs.

In Ile-de-France and the adjacent provinces, churches of s some importance all have over the side aisles a gallery of t the same width forming a second side aisle in the second story. That arrangement permits the avoidance of the difficulties just mentioned, since the enclosing wall of the gallery in the second story presents a vertical surface of sufficient h height to rest a covering against it. What is said here is p perfectly explained by the external view of the apsidal chapels of the cathedral of Senlis (Fig. 30). But also these chapels have but small depth, and were not convenient in use on account of their narrowness.

Before passing onward, we must return to what was said of the apsidal chapels of the churches of Poitou and of Aquitaine. In these provinces the side aisles of churches have nearly the height of the principal nave. (Art. Architecture Religieuse), so as to abut the thrust of the central vaults, although this mode of treatment has the inconvenience of opening windows above the side aisles beneath the upper vaults, it h had the advantage of avoiding the construction of flying buttresses, and of giving very high side aisles against which c could abut the chapels of good dimensions in diameter and height, without their covering exceeding the level of the cornices of those side aisles. The chapel was then a small semicircular apse attached to a high wall; it was an addition to the edifice, an independent structure, so to speak, having its own treatment.

The example taken from the most beautiful monument of this kind in Saintonge, and that we give (33), will explain clearly

rule of that order, that desired monastic structures to restrict themselves to the simplest form. Indeed circular chapels cause important expenses, because the make the construction complicated, require considerable extent of walls, demand costly work, roofs executed with difficulty, intersections and special sections, consequently great precautions in details. On the contrary square chapels only add an area to the side aisle; require only a very simple enclosing wall and coverings, that are merely the extension of those of the side aisle of the apse; the buttresses necessary to abut the upper vaults serve as walls separating them; the vaults composed of two p pointed arches are more economically constructed than vaults covering a semicircular area, and a single window instead of two lights them. These square chapels are then but really a second side aisle divided by separating walls built according to the radii from the centre of the sanctuary.[1]

Note 1. p. 464. See plan of the abbey of Clairvaux.(Art. Ar Architecture Monastique, Fig. 6).

The constructors of the church of Pontigny however desired in accordance with that rule of the order to make a concession to the taste of the time. The choir of that abbey church, erected during the last years of the 12 th century, retained the principle of apsidal chapels square externally, while imitating those chapels are an irregular polygon.

Here (32) is the plan of one of those chapels. The covering takes no account of this polygonal form; it extends uniformly over all, only allowing the ends of the flying buttresses to pierce the shed roof. Yet we must recognize that there was i indecision in the mode of covering the apsidal chapels of the church of Pontigny, for the rafters of the roofs placed beside the flying buttresses do not follow the direction of these roofs, and give reason to believe that it was desired to make either curb roofs or a shed roof over the side aisle, intersected by a gable roof with gable on each chapel. These experiments in the manner of covering apsidal chapels of monastic churches are not alone apparent at Pontigny. There was a difficulty, which evidently long embarrassed the architects of the great abbey churches during the 11 th and 12 th centuries. They came to cover these chapels by procedures having nothing frank and marking a certain indecision. That is visible in the

extreme refinement, by its delicate execution, purity of its mouldings and the perfect harmony of its proportions? The fashion of the arrangement of the decoration of the exterior of these chapels denotes an art arrived at a high elevation. Sculpture is not lavished, it is refined and yet produces a g great effect by its judicious use. The insertion of a black stone (lava) between the modillions and above the archivolts of the windows contributes to give elegance to the upper part of these chapels, without taking away any of their strength.

Note 3. p. 457. S. Savin near Poitiers.

When in the 12 th century men abandoned the half domes to definitely adopt the pointed vault, constructors profited by this new method to enlarge the windows of their chapels, and to decorate the detached columns, that received the arches a and side arches. On this principle were constructed the chapels of the abbey church of S. Denis and those of the cathedral of Noyon (middle of 12 th century), whose internal appearance we have given (28). As for the chapels of the cathedral of S Senlis, they are composed only of two bays, only one being pierced by a window. Here (29) is the plan, (30) the external view, and (31) is the internal appearance. At Noyon the transverse entrance arch is round, at S. Leu d'Esserent and at Senlis it is pointed; yet these chapels were built at the same epoch or nearly so. The chapels of Noyon are decorated by a small round-arched arcade, those of S. Leu and of Senlis being without this.

An important fact must be mentioned; these chapels are either composed of two bays as at Senlis, or of four bays as at Noyon and S. Leu, the altar of each being placed on the axis of the chevet, so as to be always orientated, and consequently in one of the lateral bays, as indicated in Fig. 31. Yet the apsidal chapels of the abbey church of S. Denis makes an exception to this rule; their altars were all placed perpendicular to the radius passing from the centre of the sanctuary and forming the axis of each chapel. In the great churches of the order of Cluny and in the cathedrals of the Oise previously cited, built at about the middle of the 12 th century, the apsidal chapels are semicircular; they are square in the churches of the order of Citeaux. At Clairvaux and Pontigny this mode is frankly adopted, and appears to us as required by the

chapels by taking the principal types in chronological order, or according to their arrangement.

The Romanesque apsidal chapels internally consist only of a semicircle with half dome, pierced by one, two or three round arched windows, simple or decorated by little columns at the jambs. These columns were intended to be painted and are not decorated by sculptures. The substructure sometimes receives an arcade.[3] On the contrary on the exterior they are enriched by mouldings, by delicate sculptures, and somentimes by facings of stones of different colors. Such are the apsidal chapels of the church Notre Dame-du-Port at Clermont, of which we give (26) an internal view, and (27) an external view. These chapels are two-story, i.e., they extend in the crypt as in the ground story: that gives them very tall proportions externally, the vaults of the crypt being above the level of the exteroal soil in order to obtain light by little openings pierced in the substructure. The two figures 26 and 27 show that the arrangement of the chapels is independent of that of the side aisles. Their cornices are not placed at the same level. Yet at Notre Dame-du-Port the difference in level between the cornice of the side aisles and that of the chapels is not such, that the stone roofs of those chapels exceeds the top of the cornice of the side aisle. To avoid the bad effect of the intersections of the roofs of these chapels with the stone roof of the side aisle, little gables A (Fig. 27) have been raised, which stop the stone roofs of the chapels, and mask a roof w with two eaves intersecting the continuous roof of the side aisle. It is skilfully combined although a little labored; b but the most simple arrangements are not those first adopted. The primitive forms of the Romanesque apsidal chapels of the central provinces and of Aquitaine differ little; and if we have chosen this example, it is because it is one of the oldest and most beautiful. The apsidal chapels of Notre Dame-du-Port are still permeated with a certain fragrance of good antiquity, that gives them a special character in our eyes. This is no longer antique architecture, but it is not the Romanesque architecture of the North and East. Whence came that art, how was it originated in the central provinces of France? How is it, that from the 11 th century it is distinguished from all the architectural styles of the other provinces by its e

Etienne of Nevers (11 th century) presents three; that of Notre Dame-du-Port of Clermont (11 th century) has four. In other provinces the apsidal chapels appear much later. For example in Normandy the sanctuaries long remain until the end of the 12 th century without side aisles, and consequently without apsidal chapels. In Burgundy we see them adopted only in the 12 th century. In the provinces of the northeast the abbeys commenced to erect apsidal chapels from the 11 th century.[1] In the 12 th century they are increased in number and extent.[2]

Note 1. p. 456. An important discovery has added a new fact to those already known. Excavations executed in the sanctuary of the cathedral of Clermont under the direction of M. Mallay and ourselves have just shown the plan of the primitive cathedral, which dates from the 10 th to the 11 th centuries; these excavations have shown four chapels around the sanctuary, as in the church of Notre Dame-du-Port.

Note 1. p. 457. Priory of S. Martin-des-Champs.

Note 2. p. 457. Cluny, Clairvaux, S. Denis; at the end of t the century, Pontigny, Vezelay, Abbey for Men of Caen, S. Remy of Rheims.

The French cathedral, that originated at the end of the 12 th century, seems to protest against this need of multiplying altars. Erected with a dominant idea, it admits chapels only quite late.(Art. Cathedrale). If we see them in the two cathedrals of Noyon and Senlis in the 12 th century, it is because these two cathedrals were erected under the evident influence of S. Denis, and again at the cathedral of Senlis, for example, whose construction is not so directly subject to that abbey as that of the cathedral of Noyon, these apsidal chapels are scarcely developed; they form in plan externally only a very flat circular arc; they can with difficulty contain a little altar, and present outside only a weak projection from the perimeter of the side aisle. But soon occurs a reaction against the principle that had excluded chapels from cathedrals; they are increased in number and extent around the apse, then are built later along the side aisles of the naves. That example is followed in the parish churches. We do not occupy ourselves with chapels built between the buttresses of the side aisles of naves, for they really consist only of a vault and a window; but we shall endeavor to present a series of apsidal

arches pierced between the old piers.

We give (24) a perspective view of that chapel, one of the best examples of the architecture of the beginning of the 14 th century, that there is in Ile-de-France, and (25) an internal view taken from the old side aisle of the 12 th century. That addition was made skilfully; in retaining the vaults of the side aisle, whose arches A B are old, the architect of t the 14 th century replaced the pier C in the underpinning, connected the two entrance piers D of the piers E of the side a aisle of the 12 th century, retained the old buttresses F; and supporting that existing behind the pier C, substituted a pointed arch transferring the weight of the upper construction to the pier G. A charming arcade decorates the sill wall of the four great windows, whose tracery offers a design of remarkable purity.

The 14 th, 15 th and 16 th centuries built near or adjacent great chunches and an innumerable number of chapels; among the most beautiful must be cited the chapel of the Virgin added to the apse of the cathedral of Rouen (14 th century), the great chapels erected at the south side of the cathedral of Lyons, and north of the cathedrals of Chalons and of Langres.(16 th century).

CHAPELS. (Comprised in the general plan of churches).

At what precise epoch did chapels come to surround the sanctuary. It would be difficult, we believe, to reply categorically to that juestion in the present state of archaeological knowledge; we shall not even attempt to discuss it, but limit ourselves to stating some facts. But first of all we must say that we give the name of chapels only to the little apses more or less deep and wide, circular, square or polygonal, that op open into the side aisles of a church; we class the chapels p placed at the end of the side aisles as in Fig. 22 of this Article, or those opening into the transepts at each side of t the sanctuary, as secondary apses. Now we see apsidal chapels opening on the side aisles around the sanctuary in churches whose construction dates in the 9 th or 10 th centuries, for example like the church of Vignory. In the centre of France we find apsidal chapels from the 10 th century.[1] The church of S. Savin (Poitou) gives us five chapels opening into the side aisles of the sanctuary.(11 th century). Church S. Etie-

built chapels more or less large at the sides or apse of the great churches, or in their vicinity and in communication with them. Monastic churches had a choir enclosed by stalls or rood screens; those present could see the offices with difficulty. Then the monasteries built chapels where the ordained religious could say the offices for the faithful outside their enclosed choir. Also sometimes old and greatly venerated chapels were left near the new churches. Thus the religious of S. Benigne of Dijon preserved the curious rotunda, that contained the relics of that saint, when rebuilding their new choir. (Art. Sepulchre, (saint)), and that chapel dating from the 10 th century was left standing at the end of the 12 th century by the religious, who rebuilt the church of Neuweiler.

That chapel, whose plan (22) we give, was placed under the name of the founder, S. Adelph, and presents a most singular arrangement. It is a little basilica in two stories, whose ground story is vaulted and the second story is covered by visible carpentry. The second story is nearly on a level with the sanctuary of the great church, while the ground story is an actual crypt in regard to the floor of the choir of the church.

We present its transverse section (23).[1]

Note 1. p. 452. This monument has just been restored and cleared by M. Boeswillwald, to whom we owe these drawings.

About the end of the 13 th century, behind the apse of the great abbey church of S. Germer (near Gournay), was built a great chapel copied from the upper S. Chapelle of Paris, and communicating with the sanctuary of the church by means of a charming gallery. This monument was executed with great care, and was decorated by grisaille glass and paintings; its altar supported the beautiful reredos of painted stone, now deposited in the Museum of Cluny at Paris, and that is one of the masterpieces of the statuary of that epoch.[2]

Note 2. p. 452. This reredos is represented as completely as possible in the Revue d'Architecture of M. C. Daly.

The cathedral of Mantes, built at the end of the 12 th century, possessed no chapel until in the 14 th century; at that epoch a chapel beside the south side aisle and choir, composed of four rectangular vaults springing from a central pier, communicating with that side aisle by the opening of two arch-

the entrance gate of the cemetery; it rose on a platform elevated about a yard above the ground; the altar is enclosed in the niche A, Figs. 19, 20; bseide it is a little piscina. At the middle of the chapel is placed a stone box of large size for gifts, that those present hastened to give for the repose of souls in purgatory. After the mass was said, the priest l left the chapel, advanced on the platform to exhort the faithful to pray for dead, and gave the benedictions. One will note that this chapel is skilfully constructed to permit to be seen the officiant by the multitude, and to shelter him as much as possible from the wind and rain. Over these short columns, t that with their bases are not over 6.6 ft. high is placed an open story, a sort of balustrade supporting the glazed windows. It is to be believed that from the crown of the vault hung a lantern kindled at night according to custom; the upper part of the chapel thus became a great lantern.(Art. Lanterne des Morts).

Note 2. p. 448. We owe these drawings to the courtesy of M. Boeswillwald).

One still finds in some cemeteries of Brittany these chapels or shelters for saying mass on the day of the dead.

The little monument composed of a supporting wall with a p pavilion roof raised on four columns, that might still be seen at the end of the last (18 th) century in the enclosure of t the charnel of the Innocents at Paris, and that is reproduced in the Statistique Monumentale of M. Albert Lenoir under the name of "Prechoir" (pulpit, is nothing more than one of these chapels of the dead intended to sheltar the priest on the day of the feast of the dead during the mass and the benediction.

Note 1. p. 451. This monument appears to date in the 14 th century.

Until the 13 th century the most important churches only p possessed a small number op chapels; cathedrals themselves w were frequently without them. (Arts. Cathedrale, Eglise).

When in the 13 th century there were established important monifications in the customs of the clergy, so that the need was felt to multiply the offices to conform to the desires of the faithful, who could not all at the same hour be present at the divine service, or to satisfy privileged societies desiring to have their own chapel, their private church, there

on an abbey, who must be placed in a choir in accordance with a hierarchical order and on two parallel lines? Why that almost total absence of windows; why that lateral doorway opening into the small ground enclosed by walls and entirely filled by tombs cut in the rock, if one cannot see in the church of S. Croix of Montmajour the funerary church of the abbey? If on the contrary, we adopt this hypothesis, its form, arrangement and dimensions are perfectly explained. The monks brought the dead in procession; he was placed beneath the porch; the brothers remained outside. After the mass was said, the body was blessed and taken through the chapel, passing through the side doorway - to deposit in in the grave. The chapel was through to enter the cemetery, that still had an outer gate. Of the only windows lighting that chapel, all three open on the enclosure serving as a place of repose. At night a lamp burned at the centre of the monument, and according to the custom in the first centuries of the middle ages, these three windows cast the light of a lamp into the charnel. During the office of the dead, a brother rang the bell suspended in the turret by a cord passing through a hole reserved for that purpose at the centre of the dome.

Note 1. p. 446. L'Arch. Byq. en France; a reply to M. Felix de Verneilh by M. L. Vitet. (Journal des Savants. Jan., Feb, May. 1853.

The chapel of S. Croix of Montmajour was built in 1019.[1] This was not only in the vicinity of private cemeteries, of religious establishments, that were erected chapels of the dead. All charnels placed in the midst of cities or near churches possessed an oratory; sometimes even that oratory was only a sort of canopy, or a pyramid of stone resting on columns, leaving openings between them, so as to allow attendants to see the priest, who on the day of the dead said the mass, and then gave the benediction in the open air.

Note 1. p. 448. See fragments of the charter founding this chapel in a manuscript history of the city of Arles, cited in the Notes d'un voyage dans le midi de la France, by M. Merimee; documents communicated by M. Ŏa Ļenormant.

There still exists a very pretty chapel of that sort at Avioth, which dates from the 15 th century. We give its plan (19), section (20) and perspective (21).[2] This chapel is placed near

or that comes from ordinary data.

The chapel of Planes in Roussillon at 3 3/4 miles from Montlouis may pass for a caprice of construction, that one finds in collecting these monuments built in the midst of deserts. It is composed of a dome resting on a triangular base and three great niches or half domes. Roughly constructed in rubble, it would be difficult to assign it a precise date. Yet the system of construction and the form of the plan do not permit us to regard it is earlier than the 13 th century.

Here is the plan (13) of that little structure. The doorway is opened at A near an angle of the equilateral triangle. Fig. 14 presents its exterior and Fig. 15 its section on the line B C. Unless assuming that the chapel of Planes was erected in honor of the holy Trinity, we cannot explain the trilobed arrangement of the plan. However that may be, we only give this example as one of the exceptions mentioned.

There exists in the enclosure of the abbey of Montmajour n near Arles a chapel erected under the name of S. Croix, and merits the entire attention of architects and archaeologists. It is an edifice composed of four half domes of equal diameter, whose arches bear the dome with square base; a porch precedes that one of the niches serving as entrance. Here (16) is its plan. The interior is only lighted by three little windows pierced in one side. The doorway A opens into a little cemetery enclosed by walls. The chapel of S. Croix of Montmajour is well built of cut stone, and its very plain ornamentation is executed with refinement, recalling the Greek churches in the vicinity of Athens. On the vertex of the dome rises a campanile. Fig. 17 presents the external elevation of this chapel, and Fig. 18 is its section on the line B G. The interior is entirely without sculpture, and probably must have b been decorated by paintings. We see in that edifice one of those chapels of the dead, that were built during the middle ages in the midst or near cemeteries, not churches to be utilized for the daily services of a community, even temporarily, as M. Vitet supposes.[1] Neither its form nor dimensions would have allowed gathering within it the monks of an abbey like t that of Montmajour, and of placing the religious in any suitable manner near the altar. Besides, why adopt a plan in the form of a Greek cross for a church intended for the religious

fulfil a vow, or to find a place of burial for themselves and their successors. S. Germain caused to be erected near the portal of church S. Vincent (S. Germain-des-Pres) a chapel in h honor of S. Symphorion and desired to be interred there.[4] In 754 under the reign of Pepin, the remains of the holy bishop were transferred from that chapel to the great church.

Note 4. p. 442. Dubreuil. Antiq. de Paris. I. II.

Cardinal Pierre Bertrand founded several chapels, among others one about 1300 at the monastery of the Cordeliers at Annonay, where was interred his mother.[5] Philip de Maiseres, councillor of king Charles V, retired to the Celestins in 1380 b but without assuming the habit; he died there in 1405, in "the same infirmary that he had built at his own cost and expense, with a beautiful chapel and a little cloister to recreate the sick."[1] The asylums, infirmaries, colleges or hospitals possessed chapels more or less extensive, but all were very rich by gifts of the faithful, and consequently were decorated with luxury and filled with precious ornaments. More modest oratories, that were frequently but a little hall covered by a roof of carpentry or a rubble vault surmounted by a tower or only a gable pierced by an opening to receive a bell, arose near a hermitage or in the difficult passes of the mountains, or some steep summit. These isolated monuments, consecrated by some religious tradition, or erected in consequence of a vow, were and still are in great veneration in certain provinces of France; persons go there in procession one day in the year to hear the mass; those present belong in the country around the monument, and the open doorway allows the priest to be s seen at the altar. These chapels are often built on very singular places, imposed either by the nature of the ground, for example like the chapel of S. Michel of Puy-en-Velay, or by some memory, tradition, existence of a tomb, traces of some miracle, perhaps even the remains of some ancient shrine. It would thus be difficult to classify these monuments, that further for the most part have no architectural character.

Note 5. p. 442. The same.

Note 1. p. 443. The same. I. II.

Yet we must make known to our readers some of these monumental oddities, and we shall choose among them the examples presenting forms, that permit assigning them a date nearly certain,

Charles VI, because that chapel was finished snder his reign; those of Charles the dauphin filled the second; in the third were his own, and in the last were those of Anne, his wife, dauphiness of Auvergne. Into that oratory the king usually r retired to hear mass."

Not only at Paris uas displayed the luxury of painting and sculpture in private chapels. "The castle of Marcouci," says abbe Lebeuf," possessed two chapels, both painted; that of t the ground story was dedicated to the holy Trinity, the other was on the level of the second story. On the vault were painted the twelve apostles, each with an article as a symbol, a and angels each holding an anthem of the Trinity noted in plain song. On the walls were the arms of Jean de Montaigu and those of his wife, Jacqueline de la Grange; there were also eagles displayed and leaves of gourds."

One can still see today the crarming chapel of mansion of Jacques Coeur at Bourges, whose vaults are painted blue with angels clad in white bearing scrolls, like those of the castle of Marcouci. But we snall not multiply citations; those here suffice to give an idea of the skill devoted to the decoration of private chapels during the middle ages.

Toward the end of the 15 th century and the beginning of t the 16 th alone, men sometimes varied from the type plan of the S. Chapelle of Paris, to adopt plans of the Greek cross,[1] rotundas with transepts,[2] square halls with a gallery for the lord of the place.[3]

Note 1. p. 442. See chapel of the chateau of Amboise.

Note 2. p. 442. Anet.

Note 3. p. 442. Ecouen.

CHAPELLES ISOLEES, DES MORTS, VOTIVE. Chapels detached, of the Dead, and Votive.

Many of our great monastic churches were at first only oratories, successively enlarged by the munificence of kings or powerful nobles. The soil of Gaul during the first Merovingian time was covered by oratories, often built in haste to perpetuate the memory of a miracle or saint. These little structures were the centres around which were founded the first monastic establishments. Later, bishops, abbots or lords founded chapels around abbeys and in the vicinity of churches, either to

the ruined piers of the ground story, although of unusual simplicity of plan. (Art. Chateau).

Note 1. p. 441. Des plus excellents bastiments de France.

Dating from the middle of the 13 th century, the construction of the S. Chapelle of the palace had an influence on the castle chapels, and its plan served as a type. After the example of the sainted king, the founders of castle chapels decorated them in the most sumptuous fashion, and added to their treasures vases and precious ornaments. The mansion S. Pol at Paris, that became one of the most habitual residences of the kings during the 14 th and 15 th centuries, possessed a chapel, "in which Charles V caused to be placed stone figures representing the apostles," says Sauval; "Charles VI had them r richly painted by Francois of Orleans, the most celebrated p painter of that time, their robes and mantles were richly enhanced by gold, blue and vermilion glazed with fine green, t their heads were accompanied by a round diadem (halo) of wood, that had baan forgotten, which was a foot in circumference (?), also gleamed with gold, red and white, the finest that could be found. At the Louvre Charles V also surrounded the principal chapel with thirteen great prophets, each one holding a roll, with a little tower of joinery terminated by a turret, in which was placed a little bell; the windows were painted with images of saints and of saints crowned by canopies, seated in a tabernacle."

The oratories belonging to the royal chapels, like those existing at Vincennes, contained relics themselves, and were f furnished with fireplace, hangings and praying desks.

The chapel of the mansion of Bourbon was one of the richest among those of the princely residences at Paris. "Louis II (duke of Bourbon)," Sauval likewise states, "as a prince devoted and liberal, took particular care of the building of the chapel as well as of its ornaments; itu vault was enhanced by gold, the enrichments covering it, its windows surrounding it being pierced so delicately, its glass in such bright colors, that lighted it; finally the stone fleurs-de-lis crowning each window, and so well conceived for a prince of the blood, sufficiently evidenced no sparing of expense. At the left of the altar was an oratory of open woodwork in which were set four great escutcheons; on the first were carved the arms of Char-

chapel within the walls of the episcopal palace. The bishop Maurice de Sully had one at Paris in two stories beside the r river, and which still existed before the sack of the archbishop's palace in 1831.

The archbishop's palace of Rheims possessed its own, that is very beautiful, in two stories, whose construction dates from about 1230. Its ground story, whose plan we give (10), is built with great simplicity, while the second story is richly decorated internally by beautiful sculptures. Fig. 11 presents the plan of that second story. According to the construction adopted in Champagne, the piers form projections inside so as to diminish the external projection of the buttresses; these piers are isolated from the wall up to 13 ft. above the ground, and give a narrow side aisle around the chapel, producing a charming effect. The walls are decorated by an arcade placed on the continuous step and the windows opening over that are without tracery.

Here (12) is the section of that little edifice of good execution, and that in spite of mutilations to be regretted passes with reason for a masterpiece; indeed one finds there all the qualities, both graceful and substantial, of the good architecture of Champagne, and beside Notre Dame of Rheims the chapel of the archbishop still appears one of the best conceptions of the 13 th century.

During the Romanesque epoch, the chapels of castles or of bishop's palaces are generally very simple, comprising a short nave with an apse, sometimes little transepts forming two recesses for the lord and his family, narrow side aisles accompanying the nave and two little apses flanking the central apse. Such was the chapel of the castle of Montargis. (Art. Chateau).

Certain castles of great importance possed two chapels, one situated in the lower court for the servants and garrison, t the other in the middle of the residence buildings for the m master of the place. That arrangement existed at Coucy, as s shown by the plan by Du Cerceau.[1] The chapel of the lower court appears to be of the Romanesque epoch; that of the castle, whose ground story is still visible, dated from the beginning of the 13 th century; it directly communicates in the second story with the great hall; it was an admirable edifice, to j judge by the numerous fragments that strew the ground around

alone are visible, as well as the corbels and fragments of t the canopies.

Here (9) is the transverse section of the holy chapel of V Vincennes, if it covers a greates area than that of Paris, it is far from presenting in section such a happy proportion. U Under the crown the S. Chapelle of the palace has a little m more than twice its width, while that of Vincennes only has from the crown of the vault to the pavement nine fifths of its width. On this point let us be permitted to note how frequently one allows himself to continue errors, easiest to check however, when one speaks of edifices of the pointed period. It is always desired that these edifices have slender proportions, and that they may have heights exaggerated in comparison to their bases; on the one hand the architects of that t time are praised for having thus piled materials on a narrow base, on the other hand, they are blamed. Now those monuments merit neither that praise nor blame; the ratio of their height to width is that, which from all time has been given to vaulted edifices; one and a half times or twice the width. If they adopt more slender proportions, this is to open windows over the side aisles, when they possess these. Why the architects of the middle ages should be praised or blamed is, for having had the merit or wrong of making the interiors of their edifices appear much higher than they actually are.

CHAPELLES DE CHATEAUX, D'EVECHES. Chapels of Castles and of Bishops' Palaces.

Each feudal lord had desired to posses within the walls of his castle a chapel, served by a chaplain or even by an entire chapter. These chapels were then not only simple oratories within the masses of the structure, but small and nearly always detached monuments with their special dependances, or connected to the residence buildings by a gallery, porch or passage. Very frequently these chapels are in two stories, so as to place the oratory of the master at the level of the apartments, which were always above the ground story, to separate the lord and his family from servants and hired retainers, t that inhabited the enclosure of the castle, and also because of that tradition mentioned by us at the beginniug of this Article. It is unnecessary to state that the bishops had their

arrangement of the whole and the character of the details, as far as possible at that epoch. It is necessary to examine the sculpture and recognize the injuries caused by rain and frost to the upper parts of the structure left unfinished during a century, to find the points of junction of the two epochs.

Fig. 8 gives the plan of the holy chapel of Vincennes,[1] with its annexes. There are at first two oratories in two stories with views of the sanctuary by small skew openings. Then at the right is a stairway leading to the upper story of the oratory, the terraces and the roofs. On the left is the sacristy with its treasury, also in two stories, the treasury having the form of a little chapel in plan and elevation, as at the S. Chapelle of the palace. A separate stairs leads to the second story of the treasury and the roof.

Note 1. p. 436. At the scale of 1\40.

It is probable that the oratory built by Louis XI between two buttresses of the S. Chapelle of Paris during the second half of the 15 th century is an imitation of those of the holy chapel of Vincennes, that arrangement appearing more convenient than that adopted by S. Louis, and lonsisting only of two recesses in the thickness of the wall (Fig. 2 at D). The king and queen thus found themselves separated from those present, and saw the priest at the altar without being seen.

At Vincennes a wide gallery is supported by the vault over the entrance, it occupies all the first bay. At Paris this is only a simple gallery at most only a yard wide. The statues of the apostles in the form of angels behind the altar were attached to the piers at Vincennes as at Paris, at the height of the window sills, supported by corbels and surmounted by canopies.[1] The sill walls below the tracery not being decorated by arcades at Vincennes, but were probably once furnished with wooden benches and hangings. The windows of the apse alone have retained their glass, that was painted in the 16 th century by Jean Cousin and represent the last judgment. Among t the stained glass of the Renaissance this can take the first rank; it is well composed and beautifully executed. The roof of the holy chapel of Vincennes is constructed of oak and combined with great perfection; it was only surmounted by a very small and simple spire, that no longer exists.

Note 1. p. 437. These figures have been broken' their traces

justified by the urgent needs. The priory of S. Martin-des-Champs at Paris also built about that epoch two great chapels, one dedicated to our Lady, the other to S. Michel.

Here (7) is the plan of the chapel of the Virgin of the abbey of S. Germain-des-Pres,[1] that is particularly distinguished from that of the S. Chapelle of Paris by the arrangement of its vaults, whose diagonal arches comprise two bays, it is believed that a drawing by M. Alexandre Lenoir made before t the destruction of that beautiful monument, and whose apse w was arranged in a fashion scharcely conforming to the customs of the middle of the 13 th century. But Pierre of Montereau, in the construction of the chapel of the Virgin, was certainly compelled to restrict himself within a very low cost, compared to the dimensions given to the edifice. That species of vault is less costly than that adopted for the Chapelle of the palace, and the existing fragments of the crowning indicate an execution with little cost. The abbey of S. Germain-des-Pres had not the resources of the king of France, however rich it might be, From this point of view the comparison of these two edifices is interesting, having been erected at nearly the same time by the same architect.

Note 1. p. 435. At the scale of 1:40.

But S. Louis was not the only king of France that built holy chapels. The vast castle of Vincennes, commenced by king John, was completed under Charles V. from a military point of view. His son began the construction of a holy chapel with g grand proportions, in the middle of its enclosure. Charles VI erected the building at the apse as far as the upper cornice, in the nave to the springings of the archivolts of the windows, and on the facade to just below the rose window. The misfortunes of the end of that reign did not permit continuing the edifice, which remained on sufferance for a century. Francois I resumed the construction about 1525, and it was only c completed under Henry II. The two sacristies and the treasury in two stories annexed to the chapel were terminated at the end of the 14 th or the beginning of the 15 th centuries. Two very distinct epochs thus concurred in the erection of the h holy chapel of Vincennes, and yet at the first glance, this monument presents a great unity. The architects of the Renaissance charged with completing it have sought to retain the

places reserved for important persons in the nave as at the S. Chapelle of the palace. It must be stated that the chapel of S. Germain-en-Laye was merely the oratory of a castle of moderate importance. All the details of that charming edifice are treated with great care; its sculpture is beautiful and entirely due to the school of Champagne, as well as the mouldings.

Note 1. p. 434. The chapel of the castle of S. Germain-en-Laye is now very much changed; the buttresses were faced in the 17 th century with surfaces in the taste of the time; the floor in the interior was raised over a yard. The arcade was destroyed as well as the external balustrade. Yet our drawings (except the decoration of the buttresses, of which nothing has been given) rigorously present the entirety and the details of that beautiful structure. Excavations made intelligently by the architect, M. Millet, have bared the internal bases. Fragments of the arcade and of the balustrade have been found; the piers have been uncovered. As for the other parts of the edifice, they are preserved and the construction has suffered no alteration. One cannot study that chapel too much, which appears to us one of the most characteristic examples of the art of the 13 th century at the moment of its splendor. If there be some doubts of the date, it will suffice to compare its mouldings and sculpture with those of the monuments of Champagne in the 13 th century, to be assured that the chapel of the castle of S. Germain is contemporaneous with the apsidal chapels of the cathedral of Rheims, the lower parts of the cathedral of Troyes, of the chapel of the palace of the archbishop of Rheims, structures preceding 1240. The upper cornice and balustrade, fragments of which have been found, may even date back to 1230.

Rich abbeys also desired to rival sovereigns in erecting gr great oratories independent of their churches. We have stated that the abbots of S. Germain-des-Pres charged the architect Pierre of Montereau to build for them the chapel of the holy Virgin near their refectory.(Art. Architecture Monastique, Fig. 15). The abbots were feudal lords, and like them desired to imitate what the sovereign did in his domains; many abbeys a about the middle of the 13 th century saw arise within their walls great detached chapels, whose erection was not always

the thin piers slightly projecting inside is surprising, and it does not fail to disquiet the eye by an apparent excessive lightness. At S. Germain one understands how the vaults are maintained by those piers, so pronounced in the interior. The tracery is merely an accessory, only a glazed sash independent of the main construction. The little passage arranged above the lower arcade, as in Champagne, by extending the windows gives air and space to the nave; it breaks the vertical lines, that are perhaps abused at the S. Chapelle of Paris. The windows themselves, instead of being relatively narrow as at Paris, are wide; their tracery is traced with the hand of a master, and recalls the beautiful compartments of the best windows of the cathedral of Rheims. The windows of the S. Chapelle of Paris have one defect, which would appear much worse, if they did not dazzle one by the splendor of the stained glass, which is that the little columns of the tracery are too long, and that the upper tracery only commences at the springing of the pointed arches. (Art. Fenetre). That gives to these windows a thin and porr appearance, that the architect desired to conceal on the exterior, where the glass pruduces no illusion, by those details of archivolts and gables just mentioned. At the chapel of S. Germain is no superfluous detail; the construction alone makes the entire decoration; and without desiring to injure Pierre of Monterau, one can say that if the a architect of the chapel of S. Germain (probably from Champagne) had had at his commaand the treasures employed for the construction of that at Paris, he would have built a monument superior in composition to that we now admire in the city. He knew (a rare thing) how to conform his architecture to the s scale of the monument, and disposing of moderate resources, to give it all the amplitude of the great edifice. At the S. Chapelle of Paris are found experiments, researches, that occupy the mind rather than charm. At S. Germain all is clear and is understood at the first glance. The master of that work was sure of his art; he was at the same time a man of taste and a skilful man of the first order.[1] The interior of that monument was painted and the windows were probably filled with stained glass. Useless to state that its effect would be prodigious because of the large surfaces occupied. Nothing indicates a spire surmounting that chapel. No longer are special

pointed style of the royal domain, but it is derived from the schools of Champagne and of Burgundy.

We give (4) its plan. Conformably to the constructions in C Champagne and Burgundy, the vaults rest on piers projecting inside, leaving a passage above the substructure. The transverse section (5) is made across the middle of a bay and explains the principal arrangement of that edifice. The side arches A of the vaults are isolated instead of serving as archivolts for the windows, leaving between them and the openings a space B covered by the gutter. The windows are then opened beneath the cornice and occupy all the space between the buttresses. If we examine the longitudinal section (6) through a bay and (6 bis) through the internal pier B C (Fig. 5), we can render an exact account of the system of construction adopted. The windows not being circumscribed by the side arches are rectangular; the tympanums being perforated and forming part of the tracery allow only the buttresses to appear as visibly solid. On the exterior each bay is conformed to Fig. 6 ter; the entire monument thus consists only of a substructure, buttresses and that very beautiful tracery, combined in a substantial manner; for the buttresses (very thin) are stayed by this strong tracery supporting the extremities of the upper cornice and gutter. This tracery is really only great glazed sashes placed between piers and maintaining them in t their places.

Note 3. p. 430. At the scale of 1:40. We owe these drawings to M. Millet, architect of the castle of S. Germain-en-Laye.

The system of pointed construction being adopted, we must confess that the method of construction employed at the holy chapel of S. Germain-en-Laye appears to us superior to that of the S. Chapelle of Paris, in that it is more frank and more in relation to the scale of the monument. The richness of the architecture of S. Chapelle of Paris, the luxury of the sculpture cannot conceal grave faults avoided at S. Germain. Thus at Paris the buttresses ent rely project externally and injure the view by their projection; they are too near each other; the upper part of the windows is rather heavy and encumbered by details' the gables surmounting them are a useless superfluity, one of those means of decoration not caused by a need. If the effect produced by the stained glass windows between

windows; crockets in the taste of that epoch and statues of angels replaces the cross flowers and crockets of the 13 th century. Charles VII likewise caused to be executed the wooden spire covered with lead, that surmounted the roof, as well as the cresting and decorations of the roof. We do not know if the [redacted]essed a spire; no view preceding the 15 th century represents it, and no text speaks of it. [1] The fact appears doubtful, for contrary to the habits of architects of the 13 th century, nothing in the construction of the masonry indicates that this spire was erected. Perhaps some tower of the palace in the vicinity of the S. Chapelle took the place of the bell tower. Louis XII was gouty and unable to ascend to the S. Chapelle by the stairway of the palace that he did not inhabit, and carried along the side a great stairway covered by vaults and a roof. This stairway was sufficiently easy for porters to carry his litter up to the porch. The vaults of that stairway were destroyed by the fire of 1630,[2] and replaced by a wooden shed roof.

Note 1. p. 430. The spire of Charles VII has bust been restored under the direction of our colleague M. Lassus (Art. Fleche); it had been burned in 1630 and replaced by a spire in the taste of that time, which was destroyed at the end of the last (18 th) century.

Note 2. p. 430. We have seen some remains of that stairway, that the last restorations caused to disappear. See the engravings of Israel Sylvestre, the painting deposited in the Museum of Versailles representing the visit of Louis XV as a child to the palace.

In imitation of the king of France, the great vassals of t the crown caused to pe built at their customary residences a roly chapel, and the king himself erected some others. That of the castle of S. Germain-en-Laye is even earlier by some years than that of the palace; its completion cannot be later than 1240. This very curious monument is very little known, and today is located in the midst of the structures of Francis I and of Louis XIV, but is sufficiently complete however, for one to render an accurate account, not only of its dimensions, but also of its section, side elevation and the details of i its construction and decoration. The holy chapel of S. Germain-en-Laye has in particular that it does not belong to the

beneath the sills of the great windows rests on a continuous plinth, and presents in quatrefoils scenes of the martyrs. (A (Art. Arcature, fig. 8). The statues of the twelve apostles, borne on corbels, are attached to the piers. At the apse a shrine with enclosure was erected behind the altar after the death of S. Louis to support the great reliquary containing the holy relics. (Art. Autel, Figs. 11, 12). The interior of S. Chapelle was entirely covered by rich painting and gilding with overlays of colored and gilded glass. But the stained glass certainly forms the most brilliant part of that decoration; it is of great beauty in composition and color, although in the execution one perceives the haste with which it must have been made.

Note 1. p. 426. This plan is at a a scale of 1:40, like all the succeeding plans.

Note 1. p. 427. In great part it was repainted under Louis XIII.

We present (3) the transverse section of the S. Chapelle of the palace, which will illustrate better than any description the simple and at the same time bold construction of this charming edifice.

Plan 2 indicates at A the annex, the treasury of charters, with the passage B communicating with the chapel. That annex was divided in three stories; that of the ground floor served as a sacristy to the upper chapel; and the last story was reached by a screw stairway and served as a deposit of charters. Another service doorway pierced in the arcade at C placed the north gallery alongside the first bays in communication with the upper chapel. Under the two windows D D two additions about a yard in depth for the width of a bay were places of honor reserved for the king and queen. But Louis XI probably found these places too exposed, and caused to be built at E a recess between the buttresses, into which he retired to hear the offices; a small skew opening with grille permitted him to see the altar without being seen.

Under Charles VII important works modified certain parts of the S. Chapelle. That prince caused the stone rose window and its stained glass to be restored, the caps of the two stairways and the crockets of the great gable. Already in the 14 th century had been changed the decoration of the gables of the

A porch precedes the principal portal; a narrow side aisle e
extends around the building. The architect must have arranged
it to not be compelled, either to raise the crown of his vault
too high, or to place the springings of the arches too near
the ground. It was dominated by the heights of the floors of
the apartments of the second story that already existed, and
it was required to place the pavement of the upper chapel on
a level with those apartments and galleries. Two service sta-
irs extended from the ground story to the second story and t
the roof. The lower chapel is lighted by windows occupying t
the entire space between the side arches and the wall below
the window decorated by an arcade, so that these windows take
the form of traingles with two curvilinear sides, they are a
admirably designed for the places(Art. Fenetre), and were for-
merly filled with stained or grisaille glass. This chapel per-
mits to be seen numerous traces of paintings of the 13 th cen-
tury,[1] and in the arcade are medallions enriched by overlays
of glass with gilding of rare delicacy, ornaments and little
figures of apostles in relief carved in the stucco formerly
painted. The pavement of that chapel is entirely composed of
tomb slabs. In the second story (Fig. 2) a porch precedes the
nave as in the ground story. Before 1793 to the mullion of
the portal was attached a statue of Christ blessing and hold-
ing the gospel. Above on the lintel was sculptured a last jud-
gement, the weighing of souls, and in the tympanum the Son of
man showing his wounds, having the holy Virgin at his right,
S. John at his left, both kneeling as at the central portal
of the cathedral of Paris. All these sculptures have been en-
tirely destroyed. The porch served for communication at the
north with the galleries of the royal palace, and so formed
a vast covered balcony on a level with the church. When one
enters the upper S. Chapelle, what is particularly striking
is the apparently extreme lightness of the construction. Abo-
ve a very rich arcade open great windows, that occupy the en-
tire space between the buttresses and beneath the side arches
of the vaults; so that the construction appears only to cons-
ist of light clusters of columns supporting these vaults. The
stained glass filling the windows by its strong coloring does
not allow to be seen the external buttresses, that alone con-
stitute the stability of the edifice. The arcade extending be-

Pierre of Montereau was likewise charged with the erection of a chapel dedicated to the Virgin within the walls of the abbey of S. Germain-des-Pres. That chapel had been founded in 1245 by abbot Hugues; now the very numerous fragments remaining to us of that structure [1] evidence a certain research, a work already meagre in the ornamentation and the mouldings, which approaches the execution of portal S. Etienne of Notre Dame of Paris, and deviates from that of the S. Chapelle; it is indeed that the chapel of the Virgin of S. Germain-des-Pres was only finished under abbot Thomas, who died in 1255. There are then about five years of difference between the construction of the S. Chapelle of the palace and the chapel of S. G Germain-des-Pres; that difference makes itself felt in the style of the two edifices; then the S. Chapelle of the palace must have been erected in four or at most five years, since it does not show in even its upper parts that tendency to research and to meagreness. We shall be pardoned for insisting on this point; we desire to prove thus again the rapidity with which the masters of works erected their edifices in the 13 th century, when they were not restricted by lack of resources, and to overthrow an opinion too generally accepted, even among enlightened persons, that the edifices of that epoch c could only have been slowly built.

Note 1. p. 425. The principal portal is deposited in the c cemetery of the Valois at S. Denis; gargoyles and portions of the crowning parts are placed in a court of one of the houses of the street of the abbey, on the north side.

When one passes through the S. Chapelle of the palace, he cannot conceive how that work, surprising by the multiplicity and variety of the details, purity of execution, richness of ornamentation and beauty of materials, could be completed in such a brief time. From base to ridge, it is entirely built of choice hard stone, a lias; each course has iron cramps s set in lead; the cutting and setting are executed with particular care. At no point can be found negligence, the usual r result of haste, and yet as it is today the S. Chapelle of t the palace is deprived of an important annex, that by itself was a monument; we speak of the treasury of charters attached to its north side and completed at the same time as it.

We give (1) the plan of the lower chapel of the palace. [1]

On the contrary at Paris in the upper chapel were deposited the crown of thorns, the pieces of the true cross and the holy relics collected by Louis IX; the lower chapel was reserved for the servants of the palace and the public; it also served for the burial of the canons. Of all palace chapels existing in France, that of Paris is today the most complete and one of the oldest. It was commenced in 1242 or 1245 and completed in 1247 on the sites of two oratories, one built in 1154 in honor of Notre Dame, the other built in 1160 under the name of S. Nicolas. Jerome Morand[2] claims that to recall these two foundations, the existing S. Chapelle is double. We see there rather the influence of preceding traditions, as we have said, and particularly a need required even by the arrangement of the palace. Thus the upper chapel communicates on a level with the halls of the second story and the royal apartments, while the lower chapel at the level of the external ground could be left to the public.

. Note 2. p. 424. Hist. de la Sainte-chapelle roy., by Jerome Morand, canon. Paris. 1790.

From all time this edifice, due to master Pierre of Montereau, was regarded with reason as a masterpiece. The king S. Louis spared nothing to make it the most brilliant jewel of the capital of his domains; and if anything could astonish us, it is the short time employed in its construction. Taking the extreme dates, one must admit, that the S. Chapelle was founded and entirely finished in the space of five years; eight hundred livres tournois ($160,000) was expended in its construction, decoration and the acquisition of the precious relics, that it contained. If one observes with scrupulous a attention the archaeological character of the S. Chapelle, he is forced to recognize the accuracy of the historical dates. The mode of construction and decoration belongs to that small fraction of the 13 th century. During the reigns of Philip A August and of S. Louis, the progress of architecture was so rapid, that a period of five years introduced sensible modifications; now the greatest unity prevails in the edifice from base to summit. This is no longer the slightly rude strength of the summit of the facade of Notre Dame of Paris (1230), a and again it is not by much the meagreness of the two extremities of the transepts of the same. (1257).

chapel was given by extension to the little churches that contained neither baptismal fonts nor tombs;[4] to oratories in w which were placed the treasures of the charches, monasteries, castles or cities,[5] charters, archives and important relics; then the parish chapels, small structures annexed to the great cathedrals, monastic or parish churches, containing an altar and even the baptismal font; to the oratories erected within the walls of cemeteries, on a placed consecrated by a miracle or the presence of a saint.[6]

Note 3. p. 423. Latin note.

Note 4. p. 423. Joan de Janua.

Note 5. p. 423. The same.

Note 6. p. 423. Latin note.

Then we shall divide this Article into; 1, holy chapels; 2, chapels or oratories of castles, of bishop's palaces; 3, detached, of the dead, votive; 4, annexed to churches; 5, chapels forming parts of churches and enclosed within their perimeter.

CHAPELLES (Saintes). Holy Chapels. S. Chapelles.

From the first centuries of Christianity were erected a great number of oratories on sites witnessing the martyrdom of saints. These oratories were most frequently composed of a c crypt with a little church over it. "When Ss. Denis, Rustic a and Eleutheros suffered martyrdom," says Dubreuil,[1] a good Christian lady named Catulla dwelt in a village of the same name. who shrouded and interred the bodies of the martyrs mentioned in a little chapel (at the foot of the hill of Montmartre), to which (by a great miracle(S. Denis brought his head in t his arms, after it had been cut off, which (chapel) was rebuilt in the time of S. Genevieve. The chapel is double, i.e., the smallest is nearly in the ground, and the other is larger and erected over that. But beneath the entire structure is s still a chapel or subterranean cellar, that however remained unknown to our fathers till the year 1611."

Note 1. p. 424. Dubreuil. Book 4. p. 1152. Edition 1612.

The arrangement of a chapel doubled in height remains traditional during the first centuries of the middle ages. We see it still preserved in the celebrated S. Chapelle of the Palace built by S. Louis at Paris; but this was not with the intention of devoting the lower chapel to the deposit of relics.

of the vault, particularly if the coating is of plaster. We h have also seen coverings of vaults made of cement of brickdust in edifices of Languedoc. The coating further has the advantage of protecting vaults from the infiltration of rainwater, when the coverings are in a bad state, or when repairs are m made to the roofs. On pointed vaults the coverings are made with care, they were particularly designed to protect them d during the lapse of time between their completion and the construction of the carpentry. For that purpose over the springings of the vaults are arranged stone collectors with external gargoyles, that serve only during that interval of time, and also in case of dilapidation of the covering.[1] (Arts. Gargouille, Voute).

Note 1. p. 423. These gargoyles still exist at the S. Chapelle of the palace beneath the gables of the windows, and at Amiens; in the last edifice, these are openings correspond to the gargoyles that serve the gutters at the junction of the f flying buttresses.

CHAPELLE. Chapel.

"In several places priests are called chaplains," says William Durand,[2] "for from all antiquity the kings of France, when they went to war, carried with them the cope of the blessed S. Martin, that was kept under a tent, that from that cope (from caca, capella) was called the chapel. And the clerics to whose care was entrusted that chapel received the name of chaplains (capellani from capella); and by a necessary consequence, this name extended in certain countries to all priests. The same is stated from all antiquity, that in military expeditions were made in the camp small structures of goat s skin covered by a roof, in which was celebrated the mass, and which from that took the name of chapel.(capella from caprarum pellibus, goat skins)."

Note 2. p. 423. Rational. Book 2. Chap. 10. P.r. 8.

The first of these two etymologies is established by a fact. The small cope that S. Martin put on after having given his tunic to the poor was relegiously preserved in the oratory of the first kings, from which that oratory took the name of chapel. (Capella). The oratory, henceforth called chapel, was c comprised within the walls of the royal palace.[3] The name of

Note 1. p. 421. Les Honneurs de la Cour. Altenor de Potottiers. 15 th century.

CHANCEL. Chancel.

Enclosure; the chancel of the choir, for the closure of the choir of a church; also employed like balustrade.

CHANFREIN. Chamfer. Bevel.

Angle cut off at 45 degrees. In the architecture of the middle ages, particularly from the pointed epoch, corners within reach of the hand are frequently chamfered instead of being left square. Chamfers are very often used on the carpentry and joinery of that epoch. (Arts. Bizeau, Charpente, Menuiserie).

CHANTIER. Workyard. Building Yard.

An indefinite and uncovered area on which are deposited the materials to serve in the construction of an edifice. (Art. C Construction). By this word is also designated wooden timbers placed horizontally on the ground to isolate or to protect f from the dampness of the ground carpentry or planks, and casks containing liquids.

CHANTIGNOLLE. Wooden Block. Bracket.

A small wooden block to prevent purlins from slipping on t the principal. The block A (1) is a bracket. The block is always attached to the principal by a tenon and mortise and is pinned to prevent slipping because of the pressure exerted by the purlin on its top. Frequently in the carpentry of the pointed period the vertical timbers are doubled; but since there were not employed bolts but simple wooden keys to hold these against the timbers between them, brackets A were placed under the doubled member, so that their weight should not break the keys, and as indicated by Fig. 2. (Art. Charpente).

CHAPE. Vault. Mortar Coating.

An old word employed for a vault or vaulted place. Today is understood by this word the coating placed on the extrados of a vault to protect it. All pointed vaults were covered by a coating of mortar or of plaster. In case of fire that precaution suffices to prevent the embers from calcining the extrados

noble ladies, whose amusements were rare, except the great p public festivals. A chair with back was found at the end of the passage, a dressing table, small table, stools and ottomans for sitting, composed the furniture. (See Dictionnaire du mobilier). (Old French poem).[1]

Note 1. p. 420. Roman du Renart. Verse 22162 et seq.

We give a plan (1) of one of these private chambers, that so far as possible was placed at the angle of the building, and thus by this means was placed in communication with a turret, that served as a boudoir or retiring room. The arrangement indicated here is frequently found with nearly the same details in castles of the 13 th, 14 th and 15 th centuries. At A is the bed, at B the passage with its chair C and its r rugs D; at E is the dressing table, at F are fixed benches and cubdoards for containing the wardrobe, at G the fireplace with its little window H and its shelf I; at K are the doors, at L the turret, at M the little table with its bench N with back, O are movable stools, and X is a cupboard designed for linen and toilet articles. Ladies often received in bed mornings or evenings, and then only intimates and members of the family were admitted in the passage. During the day visits were received on the bench with several places set near the fireplace; men sat on the stools or ottomans; waiting persons or inferiors sat near the entrance on the benches of the cupboards. Ladies of high rank hung their chambers with black during the first fifteen days of deep mourning and remained in bed with closed blinds. During their child-bed the chambers were richly adorned, but also closed and lighted by torches.[1] Married persons, even in the elevated classes usually had but one chamber; among the citizens, the children during their first years slept in cradles placed close to the bed in the passage. Thus are found but a small number of chambers in houses, even if large, often a single one; servants slept in the garrets. When was received a relative or a stranger to whom honor was to be done, the masters among citizens and peasants left their chamber and went to sleep in the hall, i.e., in the large room that served both for a salon, a place of assemblage and dining room; or indeed as frequently occurred, the bed was arranged in the c chamber of the masters, and masters and strangers slept in t the same chamber.(Arts. Hotel, Maison).

CHAMBRE. Chamber. Bedroom.

A retired room in a palace, mansion or house destined to receive a bed. Because of that purpose the name of chamber was given to halls in which the king held or could hold a bed of justice; the halls in which among the great was placed the canopy beneath which sat the lord, when he exercised his rights as judge; these chambers were called chamber of the canopy, chamber of the cloth.

The great chamber of the palace at Paris was built by Enguerrand of Marigny under Philip the Fair;[1] it was richly decorated in 1506.[2]

Note 1. p. 419. Sauval. Vol. 3. p. 8.

Note 2. p. 419. Dubreul. Book 1.

John the Fearless, duke of Burgundy, caused to be built in the mansion of Artois, after the murder of the duke of Orleans, a chamber "all of cut stone for his safety, the strongest it could be and crowned by machicolations, where he slept every night." In the keep was the chamber of the lord, always found near the top and well furnished; some could be only reached by indirect corridors, by means of ladders or movable bridges removed at night.

Chambers of rich mansions were sumptuously decorated.

The beams of their ceilings were carved, painted and gilded; the windows were filled with glass and with blinds sometimes doubled, perforated by small openings or solid; the hangings of tapestry, wainscot of wood wrought with art and adjoined by fixed benches furnished with cloth backs and cushions; floored with glazed terra cotta tiles and rugs, a great fireplace, often with carved reliefs, painted shields of arms, occupied one side; it was accompanied by its accessories of lateral shelves for placing a torch, sometimes with a little opening near one jamb or under the mantle shelf itself of the fireplace, to see outside while warming one's self; screens and stools. The doors concealed behind the tapestry were narrow and low. The bed was placed perpendicular to the side apposite the fireplace, was wide and furnished with curtains aud a canopy covering; it was usually nearer one wall than the other, so as to leave a small space called the passage. Sometimes in the deep recess of one of the windows were placed a bird-cage and flowers, for birds became the ordinary companions of

of wood. There still exists in church S. Severin or S. Seurin of Bordeaux an episcopal throne of stone from the end of the 14 th century, thus composed in magnificent fashion.(3). At t the centre of the canopy and on the front between the two gables is carved a bishop's mitre supported by two angels. The seat and arms are delicately perforated. The four piers supporting the canopy were formerly decorated by statuettes, now destroyed. Two other figures were likewise placed on two consoles set in the wall below the canopy and above the seat. T This is now displaced, it was formerly fixed at the back of the sanctuary according to custom.

In Normandy, Brittany and more frequently in England are to be seen in the sanctuaries of churches without side aisles s seats constructed in the thickness of the wall at the left of the altar, and forming a regular arcade, in which sat the officiant and his two acolytes. These permanent seats are sometimes of different heights, as if to indicate the hierarchical order in which men should sit. The Glossary of Architecture by Mr. Parker of Oxford gives quite a large number of examples, from the Romanesque epoch to the 16 th century. We refer our readers to that excellent work. In France this sort of se seats are very rare, and it is probable that from a very early epoch they were made of wood, or at least independent of the construction, like that we give.(Fig. 3). These seats or English forms are ordinarily combined with the piscina; in t that case there are four arches instead of three, the piscina being in the one nearest the altar.

But at the end of the 15 th century were preferably established the episcopal thrones or seats at the head of the choir stalls at the left of the altar.(Art. Stalle).

In chapter halls there was also in the middle of the seats that of the president of the chapter, of the bishop or the a archbishop. At Mentz is still seen one of these seats,that d dates from the 12 th century, in the square hall adjoining the cloister of the cathedral.

The name of chair was also given to the stalls of the religious or of chapters during the middle ages and until the 17 th century.

CHAMBRE. Chamber. Bedroom.

the prelate before his enthronement gave his first blessing to the people, clothed in his pontifical vestments,[2] then passed on horseback in procession toward the city.

Note 2. p. 414. See Bull. monum. published by M. de Caumont. 1847. p. 528.

There is seen in the church Notre Dame-des-Dons, cathedral of Avignon, the throne of veined white marble formerly fixed at the back of the sanctuary; it is now placed on the right of the altar, and still serves as the episcopal throne, we believe. That throne dates from the 12 th century; it is very beautiful in composition and work.(2). On one side is sculptured the lion of S. Mark, on the other being the bull of S. Luke. One feels still the antique influence in this furniture, as in the architecture of Provence at that epoch. But there exists a throne of stone from the 13 th century, preserved in the cathedral of Toul, and known under the name of the throne of S. Gerard, whose form as well as details are foreign to a antique traditions. The arms are composed with that respect for customs or needs, that characterizes the arts of that epoch. The sculpture is frank, perfectly at the scale of the l little monument, rich without being overloaded. It is difficult to find a composition more simple and better decorated.[1] Thick cushions were naturally placed on the seats of this furniture.

Note 1. p. 417. See Annales archeol. Vol. 2. p. 175, an engraving of this beautiful throne.

"At the back of the sanctuary of the cathedral of Rheims", says M. Didron in his Annales archaeologiques,[2]"behind the principal altar was to be seen before 1793 a stone throne 5.6 ft. high. There were enthroned the new archbishops. This monument of Rheims was called the chair of S. Rigobert. On this throne during the vacancy of the archiepiscopal throne was p placed the oldest cross of all the treasures of the cathedral. By that S. Nicaise, S. Remy, S. Rigobert or even Hincmar, to whom the cross might have belonged, were reputed to govern t the diocese while awaiting the appointment of a new archbishop."

Note 2. p. 417. Vol. 2. p. 175.

Above the episcopal throne was suspended a cloth canopy; but later during the 14 th and 15 th centuries, this canopy entered into the composition itself, and like that was made of stone

churches anw approaching the form adopted from the 16 th century. Yet this furniture is indispensable today, and if the architects of the 12 th and 13 th centuries had executed pulpits, they would certainly have given them forms perfectly in harmony with their purpose and the materials employed, marble, stone, metal or wood. In the absence of all documents, we believe we should refrain, leaving to each one the care of fulfilling this new purpose.

CHAIRE. Cathedra. Episcopal Throne.

In the primitive churches, the seat of the bishop was placed at the bagk of the apse behind the altar.(Art. Cathedrale). This arrangement still exists in some Italian basilicas; it is found retained in the cathedral of Lyons, the sanctuary b being enclosed and without side aisles. The seat of the abbot in the abbey churches before the 12 th century was placed in the same manner. These thrones were generally fixed (that is why we consider them here), of marble, metal, stone or wood, and were joined to benches or stalls arranged at each side along the walls of the apse. We still possess in France some examples in small number, of this fixed furniture belonging to the architectural arrangement of the sanctuary; they have only been displaced. We have seen in Germany one of these apsidal thrones of stone, remaining in place, though mutilated, in the cathedral of Augsburg. The style of that monument is very old,[1] but is not so peculiar to the country beyond the Rhine, that we could regard it as belonging to the Carlovingian epoch of the West.

Note 1. p. 414. We believe it to be of the 9 th century. T The seat, its support and base are cut from a single block; the lions hold rollers in their front paws.

We think that this throne should be given (1), one of the oldest pieces of fixed furniture possessed by the Romanesque architecture of the North. Its form much approaches those of the antique chairs possessed by the museums of France and Italy.

In the sacristy of the church of the old priory of S. Vigor near Bayeux, there exists a throne of red marble formerly placed at the back of the sanctuary. The new bishop came to sit on the throne on the eve of his entry into Bayeux. From it t

the vaults of churches when they feared finding contradictors among the assembled multitude. Those permitted to cause a sc scandal in the middle of a field or on a public place, neither dared nor could do so within the walls of a church.

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A porch precedes the principal portal; a narrow side aisle e extends around the building. The architect must have arranged it to not be compelled, either to raise the crown of his vault too high, or to place the springings of the arches too near the ground. It was dominated by the heights of the floors of the apartments of the second story that already existed, and it was required to place the pavement of the upper chapel on a level with those apartments and galleries. Two service stairs extended from the ground story to the second story and t the roof. The lower chapel is lighted by windows occupying t the entire space between the side arches and the wall below the window decorated by an arcade, so that these windows take the form of traingles with two curvilinear sides, they are a admirably designed for the places(Art. Fenetre), and were formerly filled with stained or grisaille glass. This chapel permits to be seen numerous traces of paintings of the 13 th century,[1] and in the arcade are medallions enriched by overlays of glass with gilding of rare delicacy, ornaments and little figures of apostles in relief carved in the stucco formerly painted. The pavement of that chapel is entirely composed of tomb slabs. In the second story (Fig. 2) a porch precedes the nave as in the ground story. Before 1793 to the mullion of the portal was attached a statue of Christ blessing and holding the gospel. Above on the lintel was sculptured a last judgement, the weighing of souls, and in the tympanum the Son of Man showing his wounds, having the holy Virgin at his right, S. John at his left, both kneeling as at the central portal of the cathedral of Paris. All these sculptures have been entirely destroyed. The porch served for communication at the north with the galleries of the royal palace, and so formed a vast covered balcony on a level with the church. When one enters the upper S. Chapelle, what is particularly striking is the apparently extreme lightness of the construction. Above a very rich arcade open great windows, that occupy the entire space between the buttresses and beneath the side arches of the vaults; so that the construction appears only to consist of light clusters of columns supporting these vaults. The stained glass filling the windows by its strong coloring does not allow to be seen the external buttresses, that alone constitute the stability of the edifice. The arcade extending be-

Pierre of Montereau was likewise charged with the erection of a chapel dedicated to the Virgin within the walls of the abbey of S. Germain-des-Pres. That chapel had been founded in 1245 by abbot Hugues; now the very numerous fragments remaining to us of that structure [1] evidence a certain research, a work already meagre in the ornamentation and the mouldings, which approaches the execution of portal S. Etienne of Notre Dame of Paris, and deviates from that of the S. Chapelle; it is indeed that the chapel of the Virgin of S. Germain-des-Pres was only finished under abbot Thomas, who died in 1255. There are then about five years of difference between the construction of the S. Chapelle of the palace and the chapel of S. G Germain-des-Pres; that difference makes itself felt in the style of the two edifices; then the S. Chapelle of the palace must have been erected in four or at most five years, since it does not show in even its upper parts that tendency to research and to meagreness. We shall be pardoned for insisting on this point; we desire to prove thus again the rapidity with which the masters of works erected their edifices in the 13 th century, when they were not restricted by lack of resources, and to overthrow an opinion too generally accepted, even among enlightened persons, that the edifices of that epoch c could only have been slowly built.

Note 1. p. 425. The principal portal is deposited in the c cemetery of the Valois at S. Denis; gargoyles and portions of the crowning parts are placed in a court of one of the houses of the street of the abbey, on the north side.

When one passes through the S. Chapelle of the palace, he cannot conceive how that work, surprising by the multiplicity and variety of the details, purity of execution, richness of ornamentation and beauty of materials, could be completed in such a brief time. From base to ridge, it is entirely built of choice hard stone, a lias; each course has iron cramps s set in lead; the cutting and setting are executed with particular care. At no point can be found negligence, the usual r result of haste, and yet as it is today the S. Chapelle of t the palace is deprived of an important annex, that by itself was a monument; we speak of the treasury of charters attached to its north side and completed at the same time as it.

We give (1) the plan of the lower chapel of the palace. [1]

On the contrary at Paris in the upper chapel were deposited the crown of thorns, the pieces of the true cross and the holy relics collected by Louis IX; the lower chapel was reserved for the servants of the palace and the public; it also served for the burial of the canons. Of all palace chapels existing in France, that of Paris is today the most complete and one of the oldest. It was commenced in 1242 or 1245 and completed in 1247 on the sites of two oratories, one built in 1154 in honor of Notre Dame, the other built in 1160 under the name of S. Nicolas. Jerome Morand[2] claims that to recall these two foundations, the existing S. Chapelle is double. We see there rather the influence of preceding traditions, as we have said, and particularly a need required even by the arrangement of the palace. Thus the upper chapel communicates on a level with the halls of the second story and the royal apartments, while the lower chapel at the level of the external ground could be left to the public.

. Note 2. p. 424. Hist. de la Sainte-chapelle roy., by Jerome Morand, canon. Paris. 1790.

From all time this edifice, due to master Pierre of Montereau, was regarded with reason as a masterpiece. The king S. Louis spared nothing to make it the most brilliant jewel of the capital of his domains; and if anything could astonish us, it is the short time employed in its construction. Taking the extreme dates, one must admit, that the S. Chapelle was founded and entirely finished in the space of five years; eight hundred livres tournois ($160,000) was expended in its construction, decoration and the acquisition of the precious relics, that it contained. If one observes with scrupulous a attention the archaeological character of the S. Chapelle, he is forced to recognize the accuracy of the historical dates. The mode of construction and decoration belongs to that small fraction of the 13 th century. During the reigns of Philip A August and of S. Louis, the progress of architecture was so rapid, that a period of five years introduced sensible modifications; now the greatest unity prevails in the edifice from base to summit. This is no longer the slightly rude strength of the summit of the facade of Notre Dame of Paris (1230), a and again it is not by much the meagreness of the two extremities of the transepts of the same. (1257).

chapel was given by extension to the little churches that contained neither baptismal fonts nor tombs;[4] to oratories in which were placed the treasures of the charches, monasteries, castles or cities,[5] charters, archives and important relics; then the parish chapels, small structures annexed to the great cathedrals, monastic or parish churches, containing an altar and even the baptismal font; to the oratories erected within the walls of cemeteries, on a placed consecrated by a miracle or the presence of a saint.[6]

Note 3. p. 423. Latin note.

Note 4. p. 423. Joan de Janua.

Note 5. p. 423. The same.

Note 6. p. 423. Latin note.

Then we shall divide this Article into; 1, holy chapels; 2, chapels or oratories of castles, of bishop's palaces; 3, detached, of the dead, votive; 4, annexed to churches; 5, chapels forming parts of churches and enclosed within their perimeter.

CHAPELLES (Saintes). Holy Chapels. S. Chapelles.

From the first centuries of Christianity were erected a great number of oratories on sites witnessing the martyrdom of saints. These oratories were most frequently composed of a c crypt with a little church over it. "When Ss. Denis, Rustic a and Eleutheros suffered martyrdom," says Dubreuil,[1] a good Christian lady named Catulla dwelt in a village of the same name. who shrouded and interred the bodies of the martyrs mentioned in a little chapel (at the foot of the hill of Montmartre), to which (by a great miracle(S. Denis brought his head in t his arms, after it had been cut off, which (chapel) was rebuilt in the time of S. Genevieve. The chapel is double, i.e., the smallest is nearly in the ground, and the other is larger and erected over that. But beneath the entire structure is s still a chapel or subterranean cellar, that however remained unknown to our fathers till the year 1611."

Note 1. p. 424. Dubreuil. Book 4. p. 1152. Edition 1612.

The arrangement of a chapel doubled in height remains traditional during the first centuries of the middle ages. We see it still preserved in the celebrated S. Chapelle of the Palace built by S. Louis at Paris; but this was not with the intention of devoting the lower chapel to the deposit of relics.

of the vault, particularly if the coating is of plaster. We h have also seen coverings of vaults made of cement of brickdust in edifices of Languedoc. The coating further has the advantage of protecting vaults from the infiltration of rainwater, when the coverings are in a bad state, or when repairs are m made to the roofs. On pointed vaults the coverings are made with care, they were particularly designed to protect them d during the lapse of time between their completion and the construction of the carpentry. For that purpose over the springings of the vaults are arranged stone collectors with external gargoyles, that serve only during that interval of time, and also in case of dilapidation of the covering.[1] (Arts. Gargouille, Voute).

Note 1. p. 423. These gargoyles still exist at the S. Chapelle of the palace beneath the gables of the windows, and at Amiens; in the last edifice, these are openings correspond to the gargoyles that serve the gutters at the junction of the f flying buttresses.

CHAPELLE. Chapel.

"In several places priests are called chaplains," says William Durand,[2] "for from all antiquity the kings of France, when they went to war, carried with them the cope of the blessed S. Martin, that was kept under a tent, that from that cope (from caca, capella) was called the chapel. And the clerics to whose care was entrusted that chapel received the name of chaplains (capellani from capella); and by a necessary consequence, this name extended in certain countries to all priests. The same is stated from all antiquity, that in military expeditions were made in the camp small structures of goat s skin covered by a roof, in which was celebrated the mass, and which from that took the name of chapel.(capella from capraru m pellibus, goat skins)."

Note 2. p. 423. Rational. Book 2. Chap. 10. P.r. 8.

The first of these two etymologies is established by a fact. The small cope that S. Martin put on after having given his tunic to the poor was relegiously preserved in the oratory of the first kings, from which that oratory took the name of chapel. (Capella). The oratory, henceforth called chapel, was c comprised within the walls of the royal palace.[3] The name of

Note 1. p. 421. Les Honneurs de la Cour. Altenor de Pototi-ers. 15 th century.

CHANCEL. Chancel.

Enclosure; the chancel of the choir, for the closure of the choir of a church; also employed like balustrade.

CHANFREIN. Chamfer. Bevel.

Angle cut off at 45 degrees. In the architecture of the middle ages, particularly from the pointed epoch, corners within reach of the hand are frequently chamfered instead of being left square. Chamfers are very often used on the carpentry and joinery of that epoch. (Arts. Bizeau, Charpente, Menuiserie).

CHANTIER. Workyard. Building Yard.

An indefinite and uncovered area on which are deposited the materials to serve in the construction of an edifice.(Art. C Construction). By this word is also designated wooden timbers placed horizontally on the ground to isolate or to protect f from the dampness of the ground carpentry or planks, and casks containing liquids.

CHANTIGNOLLE. Wooden Block. Bracket.

A small wooden block to prevent purlins from slipping on t the principal. The block A (1) is a bracket. The block is always attached to the principal by a tenon and mortise and is pinned to prevent slipping because of the pressure exerted by the purlin on its top. Frequently in the carpentry of the pointed period the vertical timbers are doubled; but since there were not employed bolts but simple wooden keys to hold these against the timbers between them, brackets A were placed under the doubled member, so that their weight should not break the keys, and as indicated by Fig. 2. (Art. Charpente).

CHAPE. Vault. Mortar Coating.

An old word employed for a vault or vaulted place. Today is understood by this word the coating placed on the extrados of a vault to protect it. All pointed vaults were covered by a coating of mortar or of plaster. In case of fire that precaution suffices to prevent the embers from calcining the extrados

noble ladies, whose amusements were rare, except the great p public festivals. A chair with back was found at the end of the passage, a dressing table, small table, stools and ottomans for sitting, composed the furniture. (See Dictionnaire du Mobilier). (Old French poem).[1]

Note 1. p. 420. Roman du Renart. Verse 22162 et seq.

We give a plan (1) of one of these private chambers, that so far as possible was placed at the angle of the building, and thus by this means was placed in communication with a turret, that served as a boudoir or retiring room. The arrangement indicated here is frequently found with nearly the same details in castles of the 13 th, 14 th and 15 th centuries. At A is the bed, at B the passage with its chair C and its r rugs D; at E is the dressing table, at F are fixed benches and cubdoards for containing the wardrobe, at G the fireplace with its little window H and its shelf I; at K are the doors, at L the turret, at M the little table with its bench N with back, O are movable stools, and X is a cupboard designed for linen and toilet articles. Ladies often received in bed mornings or evenings, and then only intimates and members of the family were admitted in the passage. During the day visits were received on the bench with several places set near the fireplace; men sat on the stools or ottomans; waiting persons or inferiors sat near the entrance on the benches of the cupboards. Ladies of high rank hung their chambers with black during the first fifteen days of deep mourning and remained in bed with closed blinds. During their child-bed the chambers were richly adorned, but also closed and lighted by torches.[1] Married persons, even in the elevated classes usually had but one chamber; among the citizens, the children during their first years slept in cradles placed close to the bed in the passage. Thus are found but a small number of chambers in houses, even if large, often a single one; servants slept in the garrets. When was received a relative or a stranger to whom honor was to be done, the masters among citizens and peasants left their chamber and went to sleep in the hall, i.e., in the large room that served both for a salon, a place of assemblage and dining room; or indeed as frequently occurred, the bed was arranged in the c chamber of the masters, and masters and strangers slept in t the same chamber.(Arts. Hotel, Maison).

CHAMBRE. Chamber. Bedroom.

A retired room in a palace, mansion or house destined to receive a bed. Because of that purpose the name of chamber was given to halls in which the king held or could hold a bed of justice; the halls in which among the great was placed the canopy beneath which sat the lord, when he exercised his rights as judge; these chambers were called chamber of the canopy, chamber of the cloth.

The great chamber of the palace at Paris was built by Engaerrand of Marigny under Philip the Fair;[1] it was richly decorated in 1506.[2]

Note 1. p. 419. Sauval. Vol. 3. p. 8.

Note 2. p. 419. Dubreul. Book 1.

John the Fearless, duke of Burgundy, caused to be built in the mansion of Artois, after the murder of the duke of Orleans, a chamber "all of cut stone for his safety, the strongest it could be and crowned by machicolations, where he slept every night." In the keeps was the chamber of the lord, always found near the top and well furnished; some could be only reached by indirect corridors, by means of ladders or movable bridges removed at night.

Chambers of rich mansions were sumptuously decorated.

The beams of their ceilings were carved, painted and gilded; the windows were filled with glass and with blinds sometimes doubled, perforated by small openings or solid; the hangings of tapestry, wainscot of wood wrought with art and adjoined by fixed benches furnished with cloth backs and cushions; floored with glazed terra cotta tiles and rugs, a great fireplace, often with carved reliefs, painted shields of arms, occupied one side; it was accompanied by its accessories of lateral shelves for placing a torch, sometimes with a little opening near one jamb or under the mantle shelf itself of the fireplace, to see outside while warming one's self; screens and stools. The doors concealed behind the tapestry were narrow and low. The bed was placed perpendicular to the side apposite the fireplace, was wide and furnished with curtains aud a canopy covering; it was usually nearer one wall than the other, so as to leave a small space called the passage. Sometimes in the deep recess of one of the windows were placed a bird-cage and flowers, for birds became the ordinary companions of

of wood. There still exists in church S. Severin or S. Seurin of Bordeaux an episcopal throne of stone from the end of the 14 th century, thus composed in magnificent fashion.(3). At t the centre of the canopy and on the front between the two gables is carved a bishop's mitre supported by two angels. The seat and arms are delicately perforated. The four piers supporting the canopy were formerly decorated by statuettes, now destroyed. Two other figures were likewise placed on two consoles set in the wall below the canopy and above the seat. T This is now displaced, it was formerly fixed at the back of the sanctuary according to custom.

In Normandy, Brittany and more frequently in England are to be seen in the sanctuaries of churches without side aisles s seats constructed in the thickness of the wall at the left of the altar, and forming a regular arcade, in which sat the officiant and his two acolytes. These permanent seats are sometimes of different heights, as if to indicate the hierarchical order in which men should sit. The Glossary of Architecture by Mr. Parker of Oxford gives quite a large number of examples, from the Romanesque epoch to the 16 th century. We refer our readers to that excellent work. In France this sort of ss seats are very rare, and it is probable that from a very early epoch they were made of wood, or at least independent of the construction, like that we give.(Fig. 3). These seats or English forms are ordinarily combined with the piscina; in t that case there are four arches instead of three, the piscina being in the one nearest the altar.

But at the end of the 15 th century were preferably established the episcopal thrones or seats at the head of the choir stalls at the left of the altar.(Art. Stalle).

In chapter halls there was also in the middle of the seats that of the president of the chapter, of the bishop or the a archbishop. At Mentz is still seen one of these seats,that d dates from the 12 th century, in the square hall adjoining the cloister of the cathedral.

The name of chair was also given to the stalls of the religious or of chapters during the middle ages and until the 17 th century.

CHAMBRE. Chamber. Bedroom.

the prelate before his enthronement gave his first blessing to the people, clothed in his pontifical vestments,[2] then passed on horseback in procession toward the city.

Note 2. p. 414. See Bull. monum. published by M. de Caumont. 1847. p. 528.

There is seen in the church Notre Dame-des-Dons, cathedral of Avignon, the throne of veined white marble formerly fixed at the back of the sanctuary; it is now placed on the right of the altar, and still serves as the episcopal throne, we believe. That throne dates from the 12 th century; it is very beautiful in composition and work.(2). On one side is sculptured the lion of S. Mark, on the other being the bull of S. Luke. One feels still the antique influence in this furniture, as in the architecture of Provence at that epoch. But there exists a throne of stone from the 13 th century, preserved in the cathedral of Toul, and known under the name of the throne of S. Gerard, whose form as well as details are foreign to a antique traditions. The arms are composed with that respect for customs or needs, that characterizes the arts of that epoch. The sculpture is frank, perfectly at the scale of the l little monument, rich without being overloaded. It is difficult to find a composition more simple and better decorated.[1] Thick cushions were naturally placed on the seats of this furniture.

Note 1. p. 417. See Annales archeol. Vol. 2. p. 175, an engraving of this beautiful throne.

"At the back of the sanctuary of the cathedral of Rheims", says M. Didron in his Annales archaeologiques,[2] "behind the principal altar was to be seen before 1793 a stone throne 5.6 ft. high. There were enthroned the new archbishops. This monument of Rheims was called the chair of S. Rigobert. On this throne during the vacancy of the archiepiscopal throne was p placed the oldest cross of all the treasures of the cathedral. By that S. Nicaise, S. Remy, S. Rigobert or even Hincmar, to whom the cross might have belonged, were reputed to govern t the diocese while awaiting the appointment of a new archbishop."

Note 2. p. 417. Vol. 2. p. 175.

Above the episcopal throne was suspended a cloth canopy; but later during the 14 th and 15 th centuries, this canopy entered into the composition itself, and like that was made of stone

churches anw approaching the form adopted from the 16 th century. Yet this furniture is indispensable today, and if the architects of the 12 th and 13 th centuries had executed pulpits, they would certainly have given them forms perfectly in harmony with their purpose and the materials employed, marble, stone, metal or wood. In the absence of all documents, we believe we should refrain, leaving to each one the care of fulfilling this new purpose.

CHAIRE. Cathedra. Episcopal Throne.

In the primitive churches, the seat of the bishop was placed at the bagk of the apse behind the altar.(Art. Cathedrale). This arrangement still exists in some Italian basilicas; it is found retained in the cathedral of Lyons, the sanctuary b being enclosed and without side aisles. The seat of the abbot in the abbey churches before the 12 th century was placed in the same manner. These thrones were generally fixed (that is why we consider them here), of marble, metal, stone or wood, and were joined to benches or stalls arranged at each side along the walls of the apse. We still possess in France some examples in small number, of this fixed furniture belonging to the architectural arrangement of the sanctuary; they have only been displaced. We have seen in Germany one of these apsidal thrones of stone, remaining in place, though mutilated, in the cathedral of Augsburg. The style of that monument is very old,[1] but is not so peculiar to the country beyond the Rhine, that we could regard it as belonging to the Carlovingian epoch of the West.

Note 1. p. 414. We believe it to be of the 9 th century. T The seat, its support and base are cut from a single block; the lions hold rollers in their front paws.

We think that this throne should be given (1), one of the oldest pieces of fixed furniture possessed by the Romanesque architecture of the North. Its form much approaches those of the antique chairs possessed by the museums of France and Italy.

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At an angle of the church of S. Lo and on the street is found still one of those external pulpits of stone, whose door communicates with an internal stairway, and that is covered by a rich hood terminating in a pyramid.[2] That pulpit dates from the end of the 15 th century. But it is particularly during the 15 th century and at the time of the reformation, t that were established pulpits in most French churches. Preaching was at that epoch one of the means of fighting heresy with its own arms; pulpits were placed in the naves (which was not done before), so that the preacher found himself in the midst of those present. The cathedrals of Strasburg and of Besancon have retained the stone pulpits of that epoch; that of Strasburg in particular is of excessive richness and the most precious work. Its sounding board is crowned by a pyramid covered by details and infinite carvings' this monument is further in composition and ornamentation in very bad taste, approaching the style adopted in Germany at the end of the pointed period.

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from Jerusalem to Paris by land, traversing Greece, Hungary, Germany and Champagne. It was temporarily deposited at Fontenet-sous-Louvre, then transported with great pomp to S. Cloud to be kept there till Aug. 1, the day fixed for its solemn re-reception in the cathedral of Paris. There was a great multitude of people in the plain of S. Denis during the transfer of that precious relic from Fontenet to S. Cloud to see it p pass. Thenceforth every year on the second Wednesday of the month of June, the piece of the true cross was taken to the plain situated between the Chapelle, Aubervilliers and S. Denis, to be exhibited for veneration by the faithful, too numerous to be received in the cathedral.

"On leaving Notre Dame," says abbe Lebeuf,[3] "one passed to the cemetery of Champeaux, since called of the Innocents. After a stop in that place employed in some prayers for the dead, the bishop commenced the recitation of the psalter indicated above. There after an anthem of the cross, the bishop or another person in his name, being on a platform expressly erected, gave a sermon to the people; after which the same prelate, aided by the archdeacon, gave the benediction to the e entire multitude with the cross brought from Paris, turning first to the East from which the relic came, then to the South toward Paris, then to the West and finally to the North on the side next S. Denis.

Note 3. p. 411. His. de la ville et du diocese de paris. Vol. 3. p. 253.

The example of preaching in the open air is not the only one. S. Bernard preached from the stage on the top of the hill of Vezelay, before the army of crusaders assembled in the valley of Asquin, and in the presence of Louis the Young. The pulpit of the preacher was then only a small platform without enclosure; for in the midst of a vast space in the open air, the preacher must be seen on foot, his appearance in a box like our pulpits would have been ridiculous.[1]

Note 1. p. 412. In Italy certain preachers in the open air still speak from a stage; the gestures and pose of the orator then produce a great effect, however little he may be gifted with talent.

Preaching in the open air was common in the middle ages and until the time of the reformation. Preachers retired beneath

windows; one ascended there by a stairway made in the thickness of the construction. The south nave of the great church of the great church of the monastery of Jacobins of Toulouse possessed at its western extremity a pulpit of this kind, to which one ascended by a stairway opening outside the church in the little cloister; we have still seen the traces of it, although the projecting corbelling has been cut off and the niche is walled up. Thus were arranged the pulpits of the refectories of the monasteries, designed to contain the reader during the repasts of the religious. One of the oldest and m most beautiful pulpits in a refectory preserved to us is that of the abbey of S. Martin-des-Champs; we give here (2) the p plan, the section (2 bis) and the perspective (3).

One will note the ingenious arrangement of the stairs ascending to that pulpit; constructed in the thickness of the wall, closed on the internal side only by an open arcade; but to p prevent the load of the wall above from crushing that arcade, the constructor has placed the discharging arch A to relieve it, and so that this arch may not thrust at its upper end B, the two first piers C C of the arcade were inclined so as to oppose an abutment to that thrust. One would find it strange today for an architect to allow himself such boldness; to incline piers! He would be required to use artifices for obtaining this result of an abutment without rendering it apparent. at the beginning of the 13 th century, men did not resort to such artifices.

Sauval cites the pulpit of the refectory of the abbey S. G Germain-des-Pres, built by Pierre of Montereau, as a masterpiece of that kind. He says; "It was supported on a great corbel, covered by a great vine carved and leaved with incredible patience.[1] Lebeuf also speaks of the pulpit of the refectory of S. Maur-des-Fosses as being remarkable, and covered by ten images or little statues of saints of antique style, but ruder."[2] The images of these pulpits of refectories are not rare; they are always arranged nearly as represented in Figs. 2, 3.

Note 1. p. 411. Hist. de Paris. Sauval. Vol. 1. p. 341.

Note 2. p. 411. Hist. de la ville et du diocese de Paris, by abbe Lebeuf. Vol. 5. p. 154. This refectory dated from the 14 th century.

In 1109 a considerable piece of the true cross was brought

Note 2. p. 406. The stairs are of the 16 th century. This pulpit is placed in the choir and not in the nave.

But in France none of our old churches has preserved, so f far as we know, pulpits for preaching or desks able to take their places preceding the 15 th century. Particularly after the 12 th century it was the custom in our northern churches to place at the entrances of the choirs rood screens, that o one ascended to read the epistle and the gospel, and to exhort the faithful, if this occurred.(Art. Jube). However these sermons only occurred accidentally before the institution of the preaching friars. Jacques of Vitry, a writer of the 13 th century, says that "Pierre, precentor of Paris, desiring to make known the extraordinary talents of Foulques, his pupil, caused him to preach in his presence and before several skilful men in the church of S. Severin, and God so blessed his sermons, that although they were of a very simple style, that even all the learned men of Paris, aroused each other to come to hear the priest Foulques, that they said preached like a second S. Paul. This occurred about 1180."[1] It is probable that in these particular cases the preachers were placed in a movable pulpit arranged in some part of the church for the purpose. The pulpit was then,, as indicated by Fig. 1,[2] only a little desk of wood enclosed on three sides by paneling and covered in front by a rug.

Note 1. p. 407. Hist. de la ville et du diocese de Paris, by abbe Lebeuf. Vol. 1. p. 160.

Note 2. p. 407. Le Miroir historial. Manuscript of the Imp. Liby. No. 6731. 15 th century. Preaching of S. Paul.

But in the 13 th century, when the preaching orders were established to combat heresy, and explain to the people the truths of Christianity, preaching became a necessity that must be satisfied by the architectural arrangements of religious edifices. To fulfil precisely these conditions, the Dominicans and the Jacobins among others built churches with two naves, one being reserved for the choir of the religious and the divine service, the other for the sermon.(Art. Architecture Monastique, Figs. 24, 24 bis). Then the pulpits became fixed and entered into the construction. They formed a sort of balcony projecting inside the church on corbelling, accompanied by a niche in the thickness of the wall, ordinarily lighted by small

speaking there are no pulpits but two ambos or desks placed at the two sides of the choir for reading the epistles and the gospels to the faithful. That arrangement may be seen still, preserved in the little basilica of S. Clement at Rome and in that of S. Lawrence-o-t-W. From the 12 th century however, it appears that besides the ambos intended for reading of the epistles and gospels, there were also sometimes in the church a pulpit designed for preaching.

William Durand in his Rational thus expresses himself in r regard to the pulpit.[1] "The pulpit placed in the church is t the life of the perfect man, and it is so called to signify in some sort a public pulpit placed in a public place and exposed to the eyes of all. Indeed we read these words in Chronicles;'Solomon made a tribune of brass, placed in the midst of the temple, and standing thereon and holding out his hands, he spoke to the people of God.' Esdras also made a wooden platform to speak from, and when he ascended it was elevated a above all the people. Also to that pulpit was given the name of analogy (analogium), because there was read and announced the word of God. Also it was called ambo from enclosing (ambiendo), because it surrounded by an enclosure whoever ascended it."

Note 1. p. 406. Rational or Manuel des divins offices, by William Durand, bishop of Mende. Chap. 1. Par. 33. 13 th century. Translation of Barthelemy.

But most frequently it was on a movable platform, that the preacher stood, when any reason caused him to exhort the faithful gathered in a church or in the yard of a cloister.

Italian churches have retained pulpits from a quite ancient epoch, from the 13 th and 14 th centuries, they are of stone, or rather of marble or bronze. That of the cathedral of Siena dates from the 13 th century and is very beautiful;[2] it is s supported by columns set on lions, and its body is ornamented by reliefs representing the nativity. At S. Mark of Venice, the ambos placed at right and left of the rood screen take t the form of pulpits and are composed of precious materials, porphyry and jasper. One likewise sees in the church S. Miniato of Florence, in the chapel royal of Palermo, pulpits also able to serve as seats, placed at the left of the altar at t the entrance of the choir.

a hole for that purpose into the lower room of the opposite tower; an iron bar was passed through the last link, and it was not possible from the exterior to loose the chain. Fig. 1 explains this very simple arrangement.

Note 2. p. 404. There may still be seen one of these great anchors at the angle of the south wall of the cathedral of Amiens near the facade.

Note 3. p. 404. "Deniers paid for the cost of the chains that have been placed in some streets." Accounts of receipts and expenses of Valenciennes in 1414. Chains then newly made were to the number of 93, not counting the old ones.

CHAINE (of stone). Intermediate vertical lines of quoins.

In construction are designated thus the piers formed of courses of stone or of resistant materials bonding with the masonry and not projecting from the face of the walls. This procedure is rarely employed in mediaeval constructions. When t the walls are of ordiuary masonry, and it is desired to strengthen them by points of support of greater resistance at certain distances, the stone vertical quoins almost always form an external projection, and then take the name of buttresses. Yet rural structures and military or civil buildings, erected with economy sometimes present vertical stone quoins set in the walls and having no external projection,but joiniug an i internal pilaster to support a beam or any load. Then to economize materials and to avoid settelement, these quoins are c cut and set as indicated in Fig. 1; the stones A being through stones and the stones B being the external facing, C being p parts of the pilaster without bond, thus from base to the top of the wall.

In the military structures of Normandy that date from the 12 th and 13 th centuries are found vertical quoins designed to strengtnen the obtuse angles when the walls are built of rubble. The keep of Roche-Guyon presents a remarkable example of them. (Art. Donjon).

CHAIRE for preaching. Pulpit.

A sort of small gallery elevated above the floors of churches, cloisters or refectories of monasteries, destined to receive a reader or preacher. In the primitive churches, properly

appears to have hastened the decomposition of the iron, especially when the ties are placed in the heart of the masonry, far from the surfaces.

During the 15 th century constructors frequently preferred to place their ties free along the walls above the vaults, t transversely or longitudinally. Men had already recognized at that epoch the bad effects produced by iron embedded in the masonry by the masters of works of the 13 th and 14 th centuries. These exposed ties are ordinarily composed of square iron bars of 7.0 to 20.0 ft. in length, joined at their ends by joints and keys as indicated by Fig. 8.[1] The tie was strongly drawn by striking the keys, just as done today for ties with ends connected by keyed joints.

Note 1. p. 404. This detail is copied from the great tie p placed at the end of the 15 th century on the floor of the triforium of the cathedral of Amiens to stop the bending of the four crossing piers, weakened by the load of the central tower before the burning of that tower.

CHAINE. Chain.

During the middle ages and until the beginning of the 17 th century, it was customary to place at corners of vaults, at gates of cities and suburbs, at entrances of bridges, chains stretched at night, or when a surprise was feared. These chains were very heavy, and were fastened at one end to a great fixed ring, at the other were hooked to an anchor [2] or iron bar, a sort of bolt with hasp entering a fixture that was locked to prevent those passing from unhooking the chain. When the chains were stretched in a city, it became impossible for cavalry to pass; even foot passers thus found themselves stopped at each step.[3] In the streets the houses permitted chains to be fastened to their walls; but on the roads, at the entrances of bridges or suburbs, outside gates and passages, chains were attached to wooden posts with braces. These supports were designated by the name of "estaques." In time of peace gates of cities often remained open at night, and men were s satisfied by stretching chains fastened to the exterior from one tower to another. There is still seen at the Narbonne gate of Carcassonne the place of the chain; it was fixed at one end to the wall of one of the towers; the other end passed through

of the imposts are wooden timbers sawed off flush with the f face aud only 4.7 ins. square. These are ties set before turning the archivolts and transverse arches and left until the completion of the edifice, i.e. until the moment when the internal piers being loaded to the point of no longer fearing bending produced by the thrust of the vaults of the side aisles. Thus without risk the centerings of the vaults could be removed, using the timber for other purposes, leaving even t these side aisles for passage. After the construction was completed, the wooden ties were sawn off.

Fig. 7 [1] will illustrate the use of this very simple and i ingenious procedure. At A is the sawn end of the wooden tie. This method was indicated by experience; many internal piers of churches built at the end of the 12 th century have left the vertical, pushed by the thrust of the vaults of the side aisles before the completion of the construction; for to interrupt worship the least possible, scarcely were the side aisles erected and the vaults closed, than the centres were removed and a ceiling was built over the central nave at the height of the triforium, and they entered the church.

Note 1. p. 402. From a pier of the nave of the cathedral of Amiens.

At the cathedral of Rheims, whose construction was executed with great luxury, for the temporary wooden ties set under t the imposts of the arches of the piers of the side aisles were substituted iron anchors on which iron ties with eyes at each end were hooked; the construction being loaded sufficiently to not fear any bending of the piers, the tie-rods were removed; the anchors remained in place. Traces of these temporary ties are found until the end of the 14 th century.

Iron ties permanently embedded in the masonry and previously mentioned, so far as the resources of the constructors permitted being cast in lead in the fastenings or the recesses enclosing them, were sometimes simply set in mortar. We have also seen these ties covered at their ends and for their length by a strong cement, that appeared to be composed of powdered sandstone, red lead, litharge and oil, or set in a bath of resin. Tie-rods covered by this method in edifices of the end of the 13 th century are less oxidized than those embedded in lead or mortar. The presence of the lead even sometimes

that are connected together in the thickness of the piers. T This system of ties was certainly less dangerous than that em- employed at the top of the choir of the cathedral of Paris; yet in spite of the mass of lead in which it is embedded, it still had the enconvenience of cracking a great number of sto- nes. To give an idea of the swelling of iron when it passes into a state of oxide or carbonate of iron, we state that the ties placed beneath the sills of the great windows of S. chap- elle in swelling raised the courses composing the sills and the mullions supported by them, to the point of causing these mullions to bend and to break at some place, although they a are of great strength.

In the 13 th century iron was only wrought by hand, and no works existing like those of today, that supply round rods of uniform siqe and great lengths. Pierre of Montereau could st- ill tie the S. Chapelle by means of pieces of iron larger th- an those indicated in Fig. 6, since in the openings of the w windows the bars connecting the ties are over 13 ft. long; but it is necessary to believe that then the difficulty in f forging bars of that length and of large thickness was such, that men avoided their use except for absolute necessity.

In the 14 th century are already seen long iron ties placed in structures. Among other examples, we will cite the facade of the cathedral of Strasburg, that from the base of the hei- ght of the foot of the spire is tied with great care at each floor by means of long and well forged bars of iron, set in the beds of the courses; the choir of the cathedral of Carca- ssonne, likewise solidly tied by means of long and large bars of iron passing across the openings and serving as armatures for the windows; the church of S. Ouen of Rouen and the cath- edral of Narbonne.

The architects of the 13 th century not only employed perm- anent ties embedded in the masonry, they also used them as t temporary means for resisting the thrusts of the arches of t the side aisles against the internal piers before these were loaded. In the choir and nave of the cathedrals of Soissons and of Laon, in the nave of the cathedral of Amiens, in the choir of that of Tours, structures erected from 1210 to 1230, are observed above the capitals bearing the archivolts and t the pointed vaults of the side aisles, let into the lower beds

forming a void nearly 12 ins. square in the thickness of the masonry and around its entire perimeter, had contributed no little to cause the crushing of the inner and outer facings. Horizontal cross ties of wood were also connected at the middle of the longitudinal ties at each floor as indicated by Fig. 4, to connect the four piers of the tower between the o openings; but these cross ties being visible in the interior had been burned in the 13 th century before the construction of the spire.

We still find during the first half of the 13 th century w wooden ties in the military and civil structures. The keep of the castle of Coucy shows at each floor and at the level of the tops of the vaults a circular series of wooden ties about 12 × 10 ins., a sort of bond embedded in the masonry, from w which extended radial wooden ties passing under the bases of the engaged piers bearing the arches of the vaults and joining at the centre. (Art. Donjon).

Yet already at the end of the 12 th century was probably recognized the brief duration of wooden ties, for it was attempted to replace them by iron anchors. The great billet cornice that crowns the choir of the cathedral of Paris, and which was set about 1195, is composed of three courses of hard stone with through bond, whose blocks are all connected by two rows of cramps as indicated in Fig. 5. This forms a powerful tie at the top of the edifice above the vaults; but these cramps by oxidizing and thus swelling had the effect of chacking nearly all these stones lengthwise, and of making three walls side by side, out of that homegeneous top of the wall.

In constructing the S. Chapelle of Paris, Pierre of Montereau more nearly approached the system of modern ties. At the level of the mottom of the window sills of the upper chapel, at the springing of vaults and below the upper cornice, he p placed a series of cramps 12 to 20 ins. long, that instead of being fixed in each block of stone were hooked into each other as in Fig. 6. This series being placed in a groove cut in the bed of the course was cast in lead. The tie at the level of the springing of the vault was connected at each bay to a strond iron bar 2 ins. square, passing above the capitals of t the mullions across them, then forming a part of the armature of the glass. At mid-height of the windows exist similar bars,

we can now give as certain is, that there are found in nearly all Merovingian and Carlovingian structures longitudinal wooden timbers in the thickness of the walls themselves and even the foundations.[1] These timbers vary in size from 4.7 × 4.7 to 8.0 × 8.0 ins.

Note 1. p. 397. It is unnecessary to say that the wood has disappeared and is found reduced to dust, but its space exists in the masonry. Wood entirely deprived of air and surrounded by the permanent dampness of the masonry soon decays.

Until the end of the 12 th century this custom persisted, and those ties are set like our modern ties at the height of the bands indicating floors, at the springings of vaults and below the upper crowning. Works of restoration, that we have had occasion to make in the edifices of the 11 th and 12 th centuries, have allowed us to find a great number of these w wooden ties, sufficiently well preserved to leave no doubt of their use. In the nave of the abbey church of Vezelay, there exists a first series of wooden ties above the archivolts opening into the side aisles, and a second series interrupted by the high windows at the level of the abacuses of the capitals at the springing of the great vaults. These second wooden ties presents the peculiarity, that it serves to attach i iron cramps intended to receive transverse tie-rods from one wall to the other of the nave at the base of the transverse arches. Were these tie-rods destined to remain always in place to prevent the spreading of the great vaults? We do not know. It is to be believed, that they must only remain during construction, until the eave walls were loaded, or until the mortar of the vaults had acquired their entire hardness, i.e., u until the removal of the centering.(Art. Construction).

Here (1) is how are set the wooden ties anf the great cramps or anchors designed to receive the tie-rod, assuming upper c crowns to be removed, and (2) the section of the wall with t the position of the tie A and the iron anchor B below the impost of the great transverse arch.

In demolishing the tower of the abbey church of S. Denis, which dates from the middle of the 12 th century, there was found at each floor a wooden tie of large dimensions held together by iron pins at the angles, as indicated in Fig. 3, embedded in the middle of the wall. The decay of these ties form-

seen a representation ofthe last supper, unfortunately very mutilated. The Passion of our Lord is frequently represented in legendary subjects on the stained glass of churches. The last supper opens the series of these subjects, and the apostle S. John, most frequently placed on the right of Christ, is also represented leaning on the bosom of his master. In the monasteries is frequently painted the last supper on one of the walls of the refectory; but we have never been able to find in France one of these paintings complete.

CERPELIERE. Circle.
An old word employed for circle or circular enclosure.

CHAFFAUT. Scaffold.
An old word from which comes scaffold. It is chiefly used to denote a shed roof, covered gallery. (Art. Hourd). In Champagne and Burgundy, men say chaffaut for echafaud (scaffold).

CHAINAGE. Ties. Cramps. Anchors.
This word is applied to wooden timbers, to a series of iron cramps placed like the links of a chain, or even to iron rods set horizontally in the thickness of walls and intended to p prevent spreading and the disjointing of masonry structures.

The Romans and even before them the Greeks had the custom, when building with courses of cut stone or marble, of connecting the courses together by great dowels of iron, bronze or even wood, and the blocks together by cramps or dovetails. B But the Greeks and Romans set the cut stone asnlars beside and on each other without mortar. (Arts. Joint, Lit). By the Romans mortar was only employed for concrete, rubble work or bricks, never with cut stone.

From the Merovingian epoch had been adopted a mixed construction, that was no longer the scabbled rubble of the Romans, and was not antique work in cut stone, it was a sort of rough concrete faced with square stones badly cut and connected by thick beds of mortar.(Art. Construction).

From the time of Cesar the Gauls placed in the thickness of their defensive works longitudinal and transverse logs set b between the rows of stones. Perhaps that custom had left traces even after the introduction of Roman arts into Gaul. What

two stories of vaulted cellars, built with care, and sometimes even cut in the rock.

During the middle ages the cities being surrounded by walls could not extend themselves, it resulted that the sites reserved for private structures became very dear, when the population increased; then men took in height and underground the area that could not be obtained on the surface, and the cellars were sometimes inhabited. One usually descended there by an opening made before the facade on the public street. In s some provincial cities, and particularly in Burgundy, are still to be seen a great number of these descents to cellars t that encroach on the street, and are closed by shutters slightly inclined to shed rainwater.(Art. Maison).

CAVEL. Pin. Key.

An old word that signifies a wooden pin or key.(Art. Clef).

CENE. The Last Supper.

The last meal of Jesus Christ surrounded by his apostles. The last supper is sometimes scluptured on the tympanums of portals of our churches of the middle ages. It is seen represented on the lintel of the western portal of the abbey church of S. Germain-des-Pres.(12 th century). One of the most beautiful representations of the last supper is found on the lintel of the principal portal of the church of Nantua.(12 th c century). This sculpture is very remarkable; at the table of Jesus Christ are seen only eleven apostles, Judas being absent. The name of each apostle is inscribed beneath him. Here is the order in which the apostles are placed beginning at the left of the observer; Simon, Thaddeus, Bartholomew, James, Matthew, Peter, (Christ), John, Andrew, James, Philip and Thomas. S. John leans his head on the breast of our Lord. In the tympanum above is seen Christ surrounded by the four emblems of the e-evangelists; but that relief has been entirely mutilated, as well as the angels that decorate the first voussoir. On the capitalr supporting the voussoirs are seen sculptured the annunciation, visitation, birth of the Saviour, journey of the Magi, adoration by the shepherds and Magi. On the lintel of the right portal of the facade of Notre Dame of Dijon (13 th century), below the crucifixion carved in the tympanum is also

their summits to receive one or more guns. Thus the towers w were converted into cavaliers. But in France these arrangements were only made accidentally and to profit by old defenses, while in Germany we find them from the 16 th century made into a system, as one may still see at Nuremberg. Even in modern fortification the Germans have not renounced isolated towers built at certain distances behind outworks. At Rochelle during the sieges to which that city must submit, for example at the end of the 16 th century, cavaliers of earth of great importance were erected behind old enclosures, and being armed with guns of long range, did much injury to the besiegers.

Cavaliers also in certain cases took the places of traverses, i.e., their elevation above the curtains and bastions prevented the artillery of the besiegers from raking works dominated from outside; or indeed as also at S. Omer in the 17 th century, from the side of gate of S. Croix (3) they dominated afar the plains sloping toward the vicinity of a place, and forced the besieger to commence his works of approach only at a great distance. This cavalier of gate S. Croix of S. Omer was composed of a high semicircular faced battery A protected by a moat filled with water; it doubled the fire of the salient E C of the city moat easily attacked, and by means of the moat that surrounded it almost entirely, gave to the besieged a last defence strong enough to stop the enemy, who could have made a lodgement in the projecting bastion, and forced him to make a new siege to pass over it. There is the last trace of the keep of the middle ages.

CAVE. Cellar.

A subterranean vaulted story constructed under the ground story of houses. From all time palaces and houses have been built over cellars. Cellars have the advantage of preventing the natural dampness of the ground from penetrating the ground story of habitations, obtaining a place with uniform temperature and cool, permitting the preservation of fresh provisions, that ferment if exposed to changes of external temperature. B But it is particularly in countries with vineyards, that cellars have been especially constructed under houses. In Burgundy and Champagne, in the centre of southwest France are to be seen old houses of quite wretched appearance, that even possess

only pointed arches rising toward heaven, stone dentils, mysterious or fanciful sculpture, in monuments where all is methodical, reasoned, clear, orderly and accurate; where all has its place marked in advance, and recalls the moral history of man, the persevering efforts of his intelligence against material force and barbarism, his trials and his final refuge in a better world.

CAVALIER. Cavalier. Bastion.

Thus is designated an earthwork built in the midst of bastions or ramparts to double the fire and command the country. It was only in the 16 th century that men had the idea of executing these works to strengthen their weak points or to dominate the fronts. Many were constructed during the sieges of that epoch within old fronts fortified in the middle ages, and to them was generally given the name of platform; they p presented a sort of detached forts, able to fire in front or flank, with a gentle slope next the city for bringing the guns and placing them in battery. Cavaliers were either semicircular or rectangular. The oldest representations of cavaliers are carved on the marble reliefs of the beginning of the 16 th century, that ornament the walls of the tomb of Maxamilian at Innsbruck.

Here (1) is one of these cavaliers copied from one of those reliefs representing the city of Arras. It is a portion of a circle, placed behind a bastion A possessing an orillon with two uncovered batteries C and a casemate battery at the level of the bottom of the ditch. The cavalier B is faced and is p placed across the gorge of the bastion; thus it commands outside the bastion and the two adjacent curtains. Fig. 2 shows us another rectangular cavalier with its four faces enclosed, erected in the midst of a bastion, whose parapets have fascines and gabions. This cavalier is also faced, and has a gate; its parapets have fascines. This second figure is copied from the relief representing the enclosure of the city of Verona.

When men erected in the 16 th century bastions before the old walls of the middle ages, they frequently retained at certain distances the strongest towers of these enclosures, only destroying the curtains; these towers were filled with earth, their batteries were removed, and platforms were formed on t

of our populous cities; yet they always inspired in the people a sentiment of unchangeable respect; on certain days of public solemnities, they resumed their voices, a new youth, and even those who repeated the previous day beneath their vaults, that these are monuments of another age and without meaning today, without reason for existence, find them still beautiful in their old age and their poverty.[1]

Note 1. p. 392. Some one said to us one day while passing through the interior of Notre Dame of Amiens; "Yes, it is very beautiful; but it is folly to desired to preserve these monuments of another age, that says nothing more today; you could galvanize these great bodies; the mania for archaeology and for Gothic will give them some further years of existence; b but that fashion having passed, they will fall into oblivion in the midst of people, who need railways, schools, markets, abattoirs, finally everything necessary to daily life." Some years after that a great public solemnity called to the cathedral an immense assemblage; it was hung with some mediocre tapestries and its choir sparkeld with lights. our questioner no longer remembered his former statement; then he cried out; "Truly this is indeed the monument of the city; all that can be done to give splendor to a public ceremony never has that imposing appearance of the old monument, that collects the e entire people of the city beneath its vaults. See how this m multitude gives life to that great nave, so well arranged to contain it! How many illustrious persons have been sheltered by these vaults! What a marvellous idea to have desired and known how to erect the cathedral as an eternal witness of all the great events of a city, of a country; of having made this witness live and speak by presenting to the people those examples taken from the history of humanity, or rather from the human heart!" A little after, our companion was carried away by the greatness of the subject and accused us of coldness. Such is the French cathedral today; beloved in the inmost hearts of the people; in turn honored and scorned by those, who are pleased by using it, but who scarcely think of preserving it, occupied by clergy without resources and often careless, an enigma for most, the last vestige from the times of ignorance, superstition and barbarism for some, the text of phrases scribbled for dreamers, lovers of nebulous poetry, who see o

the sciences and the arts. The iconography of the cathedral on the exterior thus comprised the entire creation.

In the cathedral the statuary was replaced by paintings and stained glass windows; on those splendid tapistries were found in the choir the Passion of Jesus Christ, the apostles, evangelists and prophets, the kings of Judah, in the nave were the holy bishops. The lower windows recalled to the eyes the legends of the saints, the parables, the apocalypse and the scenes of the last judgment. Those of the chapel of the chevet consecrated to the Virgin, her story and legends, the tree of Jesse, prophets and sibyls. The pavement in its turn came to add to the dacoration by entering the universal harmony; at t the centre of the nave was inliad a labyrinth (Art. Labyrinthe), probably a symbolical figure of the obstacles met by the Christian and of the pitience with which he must be armed; in the centre of this labyrinth the names and portraits of the masters of the works were drawn, as if to indicate, that they first had to pass through long tasks before completing their work. On the stone floors of the cathedral were also seen engraved zodiacs,[1] scenes from the Old Testament,[2] and animals.[3] If we add to these decorations belonging to the monuments the tapistries and veils surrounding the sanctuaries, the rood s screens enriched by delicate sculptures, the legendary paintings of the chapels, the altars of marble, bronze or vermilion, the stalls, the reliquaries, the admirably wrought grilles, the silver lamps and the crowns of lights suspended from the vaults, the ambries either painted or covered by gold leaf a and containing the treasures, the statues of metal or of wax, the tombs, the choir enclosures covered by reliefs, the votive figures attached against piers, we could have an idea of w what a cathedral was in the 13 th century on a day of great ceremony, when the bells of its seven towers were ringing, when the king was received by the bishop and chapter according to custom, as soon as he arrived in a city.

Note 1. p. 391. Canterbury.

Note 2. p. 391. S. Omer.

Note 3. p. 391. Geneva, Canterbury.

Despoiled today, mutilated by time and the hand of man, scorned for several centuries by the successors of those who had built them, our cathedrals appeared as great tombs in the midst

after a scene of that kind, the bishop and chapter of Paris could have placed on the facade of the new cathedral, above the three portals, above the Christ, colossal statues of the kings of France, when men scarcely commenced to form an idea of the monarchical power?

Note 1. p. 390. At Paris, formerly at Amiens.

Note 2. p. 390. It has not been forgotten, that at Paris one of the two cathedral churches was placed under the title of S. Etienne. The tympanum of the south portal recalls the preaching and the martyrdom of that saint, whose statue was placed on the mullion; in the recessed jambs were ranged the statues of S. Denis, of his two companions, and of some other holy bishops of the diocese. The statue of S. Etienne is still seen in one of the lateral niches of the facade. Indeed it was to build this facade that were destroyed the remains of the old church of S. Etienne; and at the construction of this facade, the present south portal was not erected.

Note 3. p. 390. Rheims.

Note 4. p. 390. Paris, on the gables of the windows of the choir; Rheims.

We cannot enter into all the details of the stairway of our great cathedrals of the North; this would be to go outside of already large limits, that we have placed for ourselves. We have only desired to cause to be understood the principle of unity, that directed the sculptures. One can see by this brief survey, that the bishops, not content with tracing the history of the birth of the Saviour, desired in the eyes of all to establish the genealogy of the Virgin, her victory over t the demon, her glorification, the relations existing between the old and new laws by the prophecies, and especially to strike the imagination by the representation of the last judgment, the reward of the good and the punishment of the wicked. As episodes of this great poem, the parable of the wise virgins, that of the prodigal son, sometimes scenes taken from t the Old Testament, the temptation and fall of Adam, the death of Abel, the deluge, the story of Joseph, of Job, that of David, the principal examples of weakness, of resignation or of human courage, of divine vengeance. Then those energetic figures of the virtues and vices personificed; finally the natural order, the seasons, elements, labors of agriculture, sci-

cite a fact related by a contemporaneous writer, Etienne of Paris. "I have seen," says he, "that the king Louis (VII), who would arrive at Paris one day, being surprised by the night, retire to a village of the canons called Creteil([illegible]). He slept there, and the inhabitants furnished the expenses. In the full morning, he was seen to meet the canons; they were much afflicted by it, and said to each other; the Church is done with, the privileges are lost; the king must repay t the expense, or the offices cease in our church. The king came to the cathedral the same day, according to the custom that he had of going to the great church at whatever time he pleased. Finding the portal closed, he demanded the reason, saying that if anyone had offended that church, he desired to indemnify it. The reply was made; truly sire, it was yourself, who contrary to the customs and sacred liberties of this holy church stopped yesterday at Creteil; not at your own cost, but at that of men of this church; that is why the offices have ceased here, and the portal is closed, the canons being resolved rather to suffer all sorts of pain, rather than to allow their liberties to be infringed in their time. This very Christain king was struck by these words. What has been done was done without premeditated purpose, said he. Night stopped me at that place, and I could not reach Paris, as I had proposed. Without force or constraint the inhabitants have incurred the expense for me, I now regret having accepted their offers. Let bishop Thiebaud come with dean Clement, let all the canons a approach, and especially the canon who is provost of that village; if I am in the wrong, I desire to give satisfaction; if I am not so, I wish to adhere to their advice. The king remained in prayer before the portal while awaiting the bishop a and canons. The doors were opened; he entered the church and there gave security for the indemnification the person of the bishop himself. The prelate gave as security to the canons h his two silver candlesticks, and the king to mark by an additional act, that he sincerly desired to pay the expense he had caused, with his own hand laid a ring on the altar, which all parties agreed to carefully preserve, because of what was written, that was in memory of the preservation of the liberties of the church." (Hist. des Dioc. de Paris, abbe Lebeuf, Vol.12). We ask, is it possible to admit, that forty or fifty years af-

Notes, p. 388. 1. Paris. 2. Paris, Amiens, Sens. 3. Amiens. 4. Paris, Amiens, Rheims, Chartres. 5. paris, Amiens, Rheims, Chartres. 6. Amiens. 6. Amiens. 7. Paris. 8. At Paris the Virgin is at the left portal, looking at the doorway; at Amiens, at the right portal. 9. Paris, Amiens. 10. The same. 11. Amiens, Rheims. 12. Paris. 13. Amiens. 14. Paris. 15. Amiens, S Senlis. 16. Paris, Amiens, Senlis, Rheims. 17. Amiens. 18. Rheims, northern portal; Amiens, Paris, Meaux, southern portal. 19. Rheims, Paris, Amiens.

Notes, pa 389. 1. At Paris, Rheims, Amiens, men have desired to see in the statues of the kings the series of the kings of France; and that popular idea dates from very early, since it was already expressed in the 13 th century. One of these statues, invariably placed on a lion, is then taken for Pepin. In the 33 Manieres des Villains, a manuscript dating from the end of the 13 th century, is read this passage:-- "The peasants come before Notre Dame at Paris, look at the kings and s say; ""here is Pepin, there is Charlemagne." And one strikes his horse behind." We do not see why the bishops, who at the end of the 12 th century fixed the general rules of the iconography of cathedrals, should have wished to represent the kings of France on the portals of churches dedicated to S. Maria, but rather the kings of Judah; for nothing recalls contemporory history in these great monuments, or when by chance it appears there, this is only in a very accessory manner; the manuscript cited here is a satire, and its author might further desire to recall a popular error, by making the Paris loafer speak thus before the portal of Notre Dame of Paris. It appears to us much more in accord with the spirit of the epoch to admit, that the statues of the kings are those of the kings of Judah, since by their presence they complete the representations of the personages that participated in the coming of Christ. The king always placed on a lion,and holding a cross and a sword, can be no other than David; the other king likewise holding a cross and a rong is Solomon. Besides, before the reign of Philip August and even until that of S. Louis, the bishops could not have the ideas of the royal power admitted at the end of the 13 th century. It will suffice us f for comprehending what was a king of France in the 12 th century in the eyes of the bishop and the chapter of Paris, to

translation of her body by angels.[15] In the tympanum is her coronation.[16] The voussoirs contain angels, the royal ancestors of the Virgin, and the prophets that announced her coming.[17] The third portal is usually reserved for the patron saint of the diocese; at Amiens S. Firmin occupies the pier; from the two sides come the representations of religious order in the old and the new law; Aaron, Melchisedec and the angel; t the first martyr priests, S. Etienne, S. Ulphius, S. Honore and S. Salve at Amiens. The lintels and tympanums of these p portals, dedicated to the patron saint of the diocese, contain his legend and the history of the transfer of his relics.[18] On the substructure or the jambs of one of these lateral portals are carved in relief a zodiac and the labors of the year.[19] At Amiens on the faces of the buttresses before these portals are placed statues of the prophets, and below are the prophets in medallions; this is a sort of prologue of the scenes carved around the portals, and that belong to the new law. On the facades of the great cathedrals of S. Maria, Mother of God, above the portals are seen a series of colossal statues of royal ancestors of the Virgin.[1] They are present at her g glorification. An upper gallery receives the statues of the holy Virgin surrounded by angels.[1] From that elevated balcony on Palm Sunday the clergy intoned in the open air the Gloria before the people assembled on the place. The apex of the gable of the nave receives a statue of Christ blessing, or an angel sounding the trumpet, as if to recall the scene of the last judgment carved on the tympanum of the central portal. The sculptures of the north and south transept portals are o ordinarily reserved for the saints particularly revered in t the diocese, or as at Paris on the south side, consecrate the memory of one of the churches annexed to the cathedral before its reconstruction.[2] Around the cathedral on the buttresses, against the walls of the chapels,[3] statues of angels hold the utensils necessary for the religious service, and instruments of music, as if to indicate that the church is an eternal concert for the glory of God.

Notes, p. 387. 1, Paris, Amiens, Chartres, S. portal; Rheims, north portal. 2. The same. 3. Amiens. 4. Paris. 5. Paris, Amiens. At Chartres the virtues and vices are sculptured on the piers of the southern porch.

in the great structure; then they adopted an iconograpny, wh whose vast and magnificent representation we have endeavored to briefly present. Let us first say that the cathedrals, that give us an entirety of nearly complete sculptures are the cathedrals of Paris, Rheims, Amiens and Chartres, all four dedicated to the holy Virgin.

Three portals open at the base of the western facade. On t the pier of the middle portal is placed erect the Christ man, blessing with the right hand and holding the gospel in the l left;[1] his feet rest on the dragon. The twelve apostles are ranged at the two sides against the jambs.[2] On the base of the figure of Christ is the figure of David,[3] or the prophets that announced his birth, and the liberal arts in relief.[4] Beneath the prophets are sculptured in relief the virtues and vices, each virtue placed over the contrary vice.[5] The four signs of the evangelists occupy the angles of the recessed jambs.[5] On the two jambs at the right of the Christ stand the wise virgins, on the left are the foolish virgins;[2] below them is a leafy tree hung with lamps at the side with the wise virgins; at the side with the foolish virgins is a dead tree struch with the axe.[3] The lintel that closes the doorway above the pier represents the resurrection, the judgment of souls, and the separation of the elect from the damned. Above in the tympanum is a Christ in the day of judgment, nude and showing his wounds; angels hold the instruments of the passion; the Virgin and S. John kneeling entreat the divine Judge.[4] In the voussoirs are angels;[5] at the left of Christ are the torments of the damned; on the right are the elect; then martyrs, confessors, virgin martyrs, kings, patriarchs or prophets, sometimes a tree of Jesse.[6] At the two sides of the portal are t the Church and the Synagogue.[7] The pier of one of the two lateral portals is occupied by the statue of the Virgin holding the infant Jesus;[8] her feet rest on the serpent with the head of a woman. On the plinth is carved the creation of man and of woman, and the history of the temptation.[9] On the head of the Virgin and serving her on a canopy is the rainbow, supported by angels.[10] At the two sides in the recessed jambs are the Magi kings, the annunciation, visitation, circumcision a and David.[11] On the lintel of the portal are seen kings and prophets,[12] or Moses, Aaron and the prophets.[13] Above is the death of the Virgin[14] or her burial by the apostles and the

the different myths they adored, the various and personified qualities of the divine power; but finally was required a melody for each of those myths. Modern harmony could not enter the head of a Greek; it had no reason to exist; on the contrary everything repelled it. With Christianity the idea of subdividing the qualities of the deity disappeared, in praying, the Christian implores the protection of God for himself, his family, for his possessions, for all humanity; his Deity covers the universe with his eyes. Now that Christian idea, a s singular fact, we see materially developed only in the 12 th century. It appears that until that awakening of the modern spirit, pagan tradition still left traces in minds, just as it left them in the architectural forms. Until the 12 th centurw, even monastic churches retained something of the subdivision of the antique Deity. In seeing the numerous Romanesque sculptures, that decorate our western monuments, one well knows how to attach these images to a common idea. Local traditions, the venerated saint, the tendencies or the history of the people direct the sculptor. The Old and New Testaments are mingled with the legends. If we find in a Cluniac church S. Antony, S. Benedict, or the archangel Michael playing an important part in the iconography; one finds these personages everywhere, inside and outside, without its being possible to assign a hierarchical order to these represeutations. All that is intermingled with figures of bazarre animals, and we do n not believe, that Romanesque symbolism can ever be clear to us, since S. Bernard treated most of these sculptures as pagan monstrosoties. Admitting, if one desires, that the fancy of t the image-maker was not important in the seliction of subjects, each church possessed its own iconography, excepting certain invariable representations.

With the cathedral of the end of the 12 th century arose m methodical iconography; anf to return to our musical comparison, each sculptor in doing his part contributes to the musical entirety, he is bound by certain laws from which he does not vary, so as to leave to the symphony its perfect unity.

Before that great epoch of French art, many cathedrals were composed of several churches and oratories. As the first step toward unity, the bishops who rebuilt these monuments in the 12 th and 13 th centuries combined these churches and chapels

In the 12 th century the modery spirit took frsm antiquity certain principles of eternal truth to appropriate and transform them. In the 16 th century men took possession of the antique form without caring much for the basis. We then believe it in error to present, as some writers of our time have desired, architecture born in the 12 th century as a sort of deviation of the human mind, an abrupt digression without relation to what has preceded and what must follow. If one takes pains to seriously study this art, setting aside the vulgar reproaches produced by prejudice, repeated by all idle minds, he will find on the contrary, developed with great energy, the elements of what we call our modern conquests, the general order with individual independence, unity in variety; harmony, cooperation of all members toward a common centre; science imposed on the form; reason dominating the material; finally criticism, to employ a word of our time, that desires tradition and inspiration to be subjected to certain logical laws. Aud it is not alone in the geometrical combination of the lines of pointed architecture, that we find the expression of its principles, it is also in sculpture and statuary.

The ornamentation and iconography of our great cathedrals of the North are subjected to these ideas of order and of universal harmony. Those myriads of figures and reliefs that decorate the cathedral compose an encyclopedic series, that not only comprises all created nature, but also the passions, virtues, vices and the history of humenity, its intellectual and physical knowledge, its arts and even its inspirations toward the absolute good. The Greek temple is dedicated to the worship of Minerva, Neptune or Diana; and considering these divinities from the highest mythological point of view, one can only discover therein a subdivision of the Deity. The temple of Minerva is for Minerva alone; her worship fulfils only one order of ideas. The Greek that desired to render the deities propitious, i.e., the supernatural power that controls the universe and his own existence, must go successively and sacrifice at the portals of the twelve gods of Olympus; he could not from his point of view believe that a sacrifice made to Ceres in order to obtain good harvests, would rended Neptune favorable to him, if he must make a sea voyage.

We freely admit, that the great minds of paganism saw in t

and pencil traces projections on his drawing board, and sees the entire monument in these geometrical drawings and in figures, the effect of the solids and voids, of light and shadow; who foresees without the need of portraying them the thousand means of erecting what he has conceived; both musician and architect are indeed forced to submit inspiration to calculation. Primitive peoples all invent melodies; this is the creation of instinct, external effusion by the sounds of that feeling; it is the desired creation, premeditated, calculated and reasoned by the man, who isharassed by the eternal "why?" Who seeks and labors, and by producing an effect and obtaining a result by his labor desires to be appreciated the efforts of his reason and the science he has necessarily displayed in c creating. Variety! May be; but the more man eats the fruit of the tree of science, the more will his vanity increase; perhaps (pray God that we are mistaken!) the day is not distant, when the love of art will be replaced by the vanity of art.

Greek architecture is a rythmic melody; but it is only a m melody, admirable as we all agree. Take from melody one member, and what remains will be no less a fragment of melody; t take an order from the Greek temple, and it will always be an order, that you can apply to a palace, a house or a tomb. From a harmony or a symphony take a part, there remains nothing, since harmony is such only by the simultaneity of the sounds.

Likewise in a pointed edifice all parts hold together; they have adopted certain forms only because of a harmony of the entirety. The reading of this Dictionary will prove it; we cannot occupy ourselves with a detail of pointed architecture and explain its function, only by indicating its place, the circumstances that impose its form, its reason for existence, independently of the taste of the artist or of the dominant style. The same modern inspiration that substitutes harmony for melody in music, in the 12 th century replaced in architecture the traditions more or less corrupt of antique art, by a succession of combinations subjected to an absolute priuciple. The cathedrals are the first and greatest effort of modern genius applied to architecture, and they rise to t the centre of an order of ideas opposed to the antique order. And while they were constructed, studies in Grecian philosophy, Roman law and Roman administration were in great favor.

practice of harmony bristled with difficulties, and its use was very restricted. M. Vincent,[1] in spite of persevering efforts to discover traces of harmony among the Greeks, was unable to arrive at any conclusive result.

Note 1. p. 384. Member of the Instute.

On the contrary in the Latin church, harmony did not cease to take a rapid development, and principally to the middle a ages must be attributed the invention and establishment of the rules, that have elevated that art to the most marvellous power.

From the epoch of Charlemagne are found traces of the art of combining simultaneous sounds, and this art is termed the organ or the art of playing the organ. It was reserved to Hucbald, a monk of S. Amand in the 10 th century to give a great impulse to harmony by establishing fixed and fruitful rules. To diaphonies with similar movements succeeded in the 11 th century diaphonies with contrary movements and varied intervals, as proved by the works of Jean Cotton and other authors. Finally during the 12 th and 13 th centuries harmony was successively enriched by all the accords, that form the basis of modern musical composition; and the treatises of Jean de Garlande, Peter Picard, Jerome of Moravia, etc., prove abundantly the use in symphony of thirds, fourths, fifths, sixths and even sevenths, the resolution of dissonant intervals into consonant ones by contrary movement; and even more still, the existence of notes of passage, of double counterpoint and imitations.[2]

Note 2. p. 384. If our assertions are doubted, one may consult the excellent work of M. de Coussemaker on this matter, and the works of M. Felix Clement, who has indeed desired to furnish us all this scientific data. (See Annales archaeologiques of M. Didron).

Now if any two arts can be compared, these are certainly m music and architecture; they explain each other; neither proceeds from the imitation of nature; they create. To create it is necessary to calculate, foresee and construct. The musician who is alone without instruments or articulating a sound, with the pen in hand and ruled paper before him, hears the m most complex harmony, who calculates and combines the effect of simultaneous sounds; the architect by the aid of compasses

projecting cornices under the vaults (projecting cornices in the interior, as if it could rain in the enterior of a hall!). It is evident that the Greeks, before all lovers of form, having invented that admirable combination of the orders, guided by a perfect t.ste and having succeeded in giving these orders inimitable proportions, set themselves to work and to s sacrifice to it frequently necessity and reason; since for t them the first of all needs was to please the senses, that the Romans were thoroughly indifferent in matters of art, but desirous of appropriating all having value in the world, desired to costume their architecture in Greek fashion, believing art to be only an external adornment, embellishing whatever wears it, whatever may be its quality or origin.

The custom adopted by the Romans in producing the strangest costumes, one readily conceives. Romanesque architecture derived from Roman architecture , no longer having under its eyes the Grecian principles pillaged by the Romans, interpreted the t traditions corrupted in a hundred different ways. The form n not being intimately connected with the material, not being a logical deduction from it, each one interpreted it in his own way. Thus Romanesque art in its turn assumed the shreds of Roman vestments without understanding their use, since this was merely a borrowed decoration, and in the different provinces of Gaul came to form separate schools, that could be subdivided infinitely. It is not so with the architecture born in t the 12 th ce tury; daughter of modern rationalism, where calculation precedes the application of form; even more it commands and subjects; if by this need natural to mankind it desires to be beautiful, it must be so according to the law of unity.

By entering the domain of another art, we can perhaps make ourselves better understood. Antique architecture is a melody; the architecture of the middle ages is a harmony. Harmony in the sense we attach to that word, i.e., the arrangement of s simultaneous tones, was unknown to the ancient Greeks; antiphony was alone practised by the voices of men and women or children singing the same melody. It was only during the first centuries of our era, that the use of fourths and fifths was admitted in Greek music, and still the tonal scale of its modes lent itself so little to simultaneous sounds, that the p

Romanesque schools that each develop in its own sphere, although daughters of the same mother, just as the Italian, French and Spanish languages are each developed on their side, although derived from the Latin. Why? Because in Roman architecture as in antique architecture art form, the envelope does n not depend absolutely on the construction, on the need to be satisfied; art is free, it depends only on tradition and inspiration, it is not a deduction from an absolute principle. Are examples deisred? We shall not repeat here what has been said of the Greek temple, which reproduces in stone or marble a construction of wood; we esteem too much those masters in all arts to accuse them of having failed thus in the most simple rules of good sense, and consequently of good taste; but it is certain, that in Greek architecture the orders assume an importance as art, that dominates the architect; art is t the master of his imagination more than reason; so what does the artist? He devotes all the faculties of his mind to perfect the form that binds him, not being able to make it flexible, he polishes it. The Romans were scarcely artists by nature, and took the form of Greek art to apply it to monuments with no relation to the principles of that art. They found t the orders; among all, they freely adopted the richest; like all parvenus confounding richness with beauty and these orders, whose origin is perfectly rigorous and definite, they applied them to the reverse of that origin; the Romans desired orders and vaults, the Greeks knew only the lintel. Must one conclude from this, that the Romans found or sought a new form adapted to their new system of construction? No. The Romans took the Grecian forms, Greek architecture and Greek orders, incrusted them on their construction like spoils, it mattered little to them, that reason was shocked by this nonsense, they are masters, but masters that pass over the need and necessity for t the satisfaction of the ages; they need vast vaulted edifices; they constructed these first, then their programme being fulfilled and finding an art all ready, they take possession of it, and hang it on their walls as one hangs a painting. Let those wishing to accuse us of exaggeration explain to us, for example, how one finds around the Coliseum complete orders w with their lintels (lintels over arches !); in the interiors of the halls of the baths are complete orders with their pro-

Note 1. p. 381. See section of the cathedral of Alby, Art. Architecture Religieuse, Fig. 51.

The cathedral of Alby is certainly the most imposing pointed edifice of the provinces of the South; it is further original and has not suffered the influences of the North, like Narbonne, Rhodez, Beziers. It is derived from the churches of the lower city of Carcassonne, from the old cathedral of Toulouse, religious monuments without side aisles, themselves only an application of the quasi Roman structures of Frejus, from Notre des Doms of Avignon, from the Major of Marseilles, churches recalling the system of construction adopted in the basilica of Constantine at Rome.

If the cathedral of Alby is a pointed edifice in means of execution, it must be recognized, that in arrangement of plan and construction it is entirely Roman and even antique. The pointed style is there only the concession made to the taste of the time, the application of a foreign form, nowise a necessity. The vault of the cathedral of Alby could have been a great round tunnel vault intersected by small tunnel vaults covering the bays between the buttresses; the stability of t the edifice would have lost nothing by the adoption of this last Romanesque or Roman system; and we will even say, that the pointed vaults covering the bays between the buttresses at the height of the great vault are nonsense; the actual construction of these vaults should have been made as tunnel vaults, turned properly to the nave and resting on these buttresses. The system would have been more solid and particularly more logical.

By studying these monuments, that adopted the forms of pointed architecture without comprehending its spirit, one recognizes how imperious is the style adopted at the end of the 12 th century in the North of France; how distinctly it separates itself from all other preceding systems of architecture.

Romanesque architecture is manifold; derived from the antique Romau principle, it could put forth various branches, each having its specified character; it is not and could not be the same with pointed architecture, there is only one pointed architecture, but there are ten, twenty Romanesque architectures. We see in Aquitaine, Auvergne, Poitou, Normandy, Burgundy, Alsace, Provence, Picardy, Ile-de-France, Maine, Champagne, Ro-

We give (50) the plan of the cathedral of Alby.[1] We have already spoken of two cathedrals of the South of France, that might at need serve as fortresses; Narbonne and Beziers; this idea is more frankly emphasized in the church S. Cecile of Alby. The western tower is a real keep without external openings in the ground story. On the southern side a fortified portal is connected to an enclosure defending the entrance, extending along the side of the cathedral, and ascending by wide steps to the level of the interior. On the north side fortified sacristies connect the cathedral to the palace of the archbishop, very well defended by thick walls and a magnificent keep.

Note 1. p. 880. At the scale of 1:1000.

S. Cecile of Alby was commenced about the middle of the 14 th century, and is merely an immense hall terminated by an apse and completely surrounded by chapels, polygonal at the chevet and square in the nave. These chapels are placed between the buttresses that abut the great vault; in two stories, these chapels communicate with each other in the second story by d doorways pierced in the buttresses, thus forming a gallery. Of the chapels of the ground story, some have pointed tunnel vaults and the others have pointed cross vaults, irregularly as indicated by the plan. The vaults of the second story are allcross vaults. The buttresses or walls between the chapels above the continuous substructure are detached in flanking t turrets, whose horizontal section gives a circular arc with a short rise. Narrow and long windows pierce the second story only in the walls and between the buttresses, lighting the nave.

The construction of the church was interrupted about the beginning of the 15 th century; the projected crowning, that certainly must have been battlements, was not built. At the beginning of the 16 th century men were satisfied by placing balustrades at the different stories of the tower, constructing some internal works, the south porch, and the enclosure of the choir by a rood screen occupying half the nave, thus forming a side aisle around the sanctuary. This great edifice is entirely built of bricks except the tracery of the windows, the balustrade of the enclosure of the choir, that are of stone; the interior was plastered and completely covered by paintings at the end of the 15 th and 16 th centuries.

north of the Romanesque nave; another doorway is pierced in the gable wall of the north tower of the chaurch that dates from the 11 th century, ~~near on~~ the first bay of the nave and served for defense, for it dominated the wall of the city, w which then passed at the base of the western wall.

At A is the cloister; it connects the bays of the chapter and the bishop's palace of the church. On the two sides of t the sanctuary between the buttresses are reserved little sacristies rising only to the sills of the windows. These sacristies are fitted with double ambries strongly ironed and made at the expense of the wall. They served as treasuries, for it was customary to place at both sides of the high altar of an abbey church or of a cathedral ambries intended to contain t the sacred vessels, reliquaries and all the precious objects. At S. Nazaire men skilfully profited by the arrangements of t the construction to establish in a permanent manner these sacristies, which were most frequently only furniture. (Art. Autel).

The cathedrals of the dioceses of existing France all, or n- nearly all, had rebuilt their cathedrals during the 12 th, 13 th and 14 th centuries; those whose work of reconstruction only commenced late mostly could not complete it. The wars that d during the last half of the 14 th century and the beginning of the 15 th stained the soil of France with blood, did not allow the continuing of these late monuments. It was only at the end of the 15 th century and the beginning of the 16 th, that the works were resumed. As we have said in describing some of these great edifices, then were made new efforts; at Troyes, Auxerre, Tours, Evreaux, Rouen, Beziers, Limoges, Bourges, Neveers, etc., the bishops or chapters devoted considerable sums to perfect the monuments, that the cooling of the zeal of the people and the wars had left incomplete. Some cathedrals in very small number were begun at that epoch. The 15 th century saw founded the cathedral of Nantes, those of Auch, Montpelier, Rhodez, Viviers; religious wars of the 16 th century again caused the suspension of the works.

We must not leave this subject without speaking of the cathedral of Alby; an exceptional monument, because of the principle of its construction and of its special arrangements, as by the nature of the material employed, brick.

taste of the time, but did not think of enlarging it;[1] while at Clermont and Limoges again, although these cathedrals were not of great dimensions, they had much extended in the 13 th century in the North the perimeter of the Romanesque churches.[2] If at the end of the 13 th century in the North the force that caused the erection of the cathedrals had commenced to weaken, it is evident that in the provinces of the South, and even in those reunited to the crown of France, there was no more than a remnant of the impulse originated by the great movement of the end of the 12 th century.

Note 2. p. 377. Today the church of the city, the episcopal seat having been transferred to the lower city since the Concordat.

Note 3. p. 377. This hall was modified in the 13 th century. The tomb of bishop Radulphe is placed in the chapel. (Art. Tombeau).

Note 1. p. 379. This plan is at the same scale as the others, 1:1000.

Note 2. p. 379. The Romanesque crypt of the cathedral of Limoges, that still exists and was placed beneath the chevet, scarcely reaches to the middle of the existing sanctuary. The foundations of the Romanesque cathedral of Clermont do not extend beyond the first bay of the choir.

Bishop Pierre de Roquefort appears to have desired at least to make his cathedral of S. Nazaire a masterpiece of elegance and richness, however modest in extent. Contrary to what we see at Narbonne, where sculpture is entirely wanting, ornamentation was lavished on the church S. Nazaire. The vast and numerous stained glass windows (for this chevet and these transepts are a real lantern) are of the greatest magnificence in composition and color.(Art Vitrail). The sanctuary is decorated by statues of the apostles and was entirely painted. The two lateral chapels of the extremity of the nave at north and south were probably only erected after the death of Pierre de Rochefort, for they do not join the transepts in construction, and in one of them, that of the north, is placed not later the tomb of the bishop, one of the most graceful monuments of the 14 th century, that we know.(Art. Tombeau).

The high winds from the southeast and west that prevail at Carcassonne caused the opening of the pricipla portal at the

(49) the plan of this curious monument. The nave and its two side aisles as far as the transepts belong to a church of the end of the 11 th century. Immediately after Carcassonne had been reunited to the crown of France under S. Louis, bishop Radulphe caused the construction at the extremity of the South transept (which was then Romanesque and must have had the present extent), of the chapel tinted gray on the plan, in a somewhat bastard pointed style, and the adjoining hall.[3] At the beginning of the 14 th century, bishop Pierre de Roquefort or Rochefort demolished the choir, the Romanesque transepts, and built the eastern part of the cathedral that we see today, in a pure pointed French style. Yet whether it was desired to remain on the old foundations of the Romanesque chevet and t transepts, or to retain a traditional arrangement that we rarely see adopted outside Carcassonne except in the church of Obazine, to the new construction was given a plan finding no analogy anywhere in the North, better still, in the Romanesque nave existed piers alternately square with engaged half columns, and cylindrical ones. That form of pier, not common in the construction of churches of the 13 th and 14 th centuries, was adopted for the six piers forming the heads of the chapels and of the sanctuary, i.e., that the two piers of the crossing at the entrance of the apse, rebuilt opposite the two Romanesque piers left in place, around the horizontal section of the latter, and the four other piers separating the chapels from the transepts took the cylindrical form, as if to connect with the old church; besides elsewhere the sections of the piers of the 14 th century adopted the forms used at that epoch. Bi- Bishop Pierre de Roquefort, in causing the eastern portion of his cathedral to be rebuilt, had the intention to limit his undertakingand to respect the Romanesque nave, since he sought to retain a certain harmony between the two constructions in spite of the difference in style. This was no longer the confidence of the northern bishops, who in the 13 th century, w when they allowed to remain for the service of the worship a portion of the former church, only doing so temporarily and rarely thinking to harmonize their new project with the Romanesque remains destined soon to be demolished also. Besides, one sees how slight are the last conditions of the cathedral of Carcassonne; they rebuilt the chuhch to conform to the

is true that this arrangement must be adopted in the nave, w which had been projected with lateral chapels, like those of Clermont and Limoges.

At Narbonne the sacristy and the treasury are placed in two of the chapels of the choir at the south; there is still a p point of resemblance to Clermont and Limoges.(Figs. 46, 47). The windows of these three monuments were filled with stained glass; but those of Narbonne were only placed during the 14 th century, and except in the chapel of the Virgin, present only grisailles with interlacings of color and armorial shields; it seems that sculpture and painting were excluded from this church; thus its appearance is rather cold. That is rather work of the learned man that of the artist. The sanctuary of narbonne, like that of Limoges, has retained its enclosure formed of the tombs of the bishops.(Art. Tombeau). The cathedral of Narbonne still possesses its cloister of the 15 th c century at the south side of the choir, like that of Beziers (Art. Cloitre), and its dependances, among others the chapter hall in a very good style.

S. Just of Narbonne is an edifice unique in that province of France in both its style and dimensions; for the cathedrals of Languedoc are generally of small extent, and most are only edifices preceding the wars of the Albigenses, repaired or partly rebuilt at the end of the 13 th century and during the 14 th century.

Toulouse alone perhaps in the 12 th century possessed a great cathedral with a single nave without side aisles, as far as one can judge from the fragment, that remains to us from that vast and beautiful edifice.[1] But toulouse was in the 12 th century a very rich city, very populous and very advanced in the culture of the arts.

Note 1. p. 377. That nave is not less than 78.7 ft. in the clear; the vaults are cross, supported on piers and abutted by buttresses forming deed internal bays or chapels between them. It is probable that this arrangement was one of those adopted before the invasion of the French style, after the wars of the Albigenses.

With that of Beziers, the cathedral of Carcassonne [2] is one of those presenting to us that invasion of the pointed style of the North in a Romaneskue monument of the South. We give

as at Limoges and Clermont, are 1.3 ft. thick and are constructed of hard stone. The entire construction is well devised, the thrusts and abutments are calculated with admirable skill, and have not made the least movement; the piers have remained perfectly vertical. In order not to weaken his prinpipal points of support by the passage of galleries, the architect has continued the external wall of the triforium around the piers. (Art. Architecture Religieuse), Fig. 38). The same arrangement is likewise found at the cathedral of Limoges. But besides t the grandeur of its plan, what gives the cathedral of Narbonne a particular appearance is the double series of buttresses, that replace the balustrades on the chapels, and which connect the pinnacles of the flying buttresses in the form of turrets. (Art. Arc-Boutants, Fig. 65). Indeed this apse is connected w with the fortifications of the archbishop's palace, and contributes at the North side to the defense of that palace. ((Art. Eveche). In the cities of the South it was a frequent custom to fortify the cathedrals. That of Beziers, besides its fortifications of the end of the 13 th century, still shows n numerous traces of its fortifications of the 12 th. The part of the cathedral of Carcassonne dating from the 11 th century is connected with the fortifications of the city.

Note 1. p. 376. An archbishop of Narbonne during the last (18 th) century desired to resume this construction and erect a church at least as far as the first bay before the transepts; the enterprise was soon suspended, the construction was resumed anew 15 years since, but only added several years since, but only added several courses to those left waiting at the end of the 18 th century. In our plan the gray tint indicates the last constructions, and the outline is the probable project.

In the 14 th century we also see the archbishops of Alby erect a cathedral, that presents all the characters of a fortress. This fact has nothing extraordinary, when one recalls t the feudal, religious and political wars, that never ceased to desolate Languedoc during the 12 th, 13 th and 14 th centuries. To return to the cathedral of Narbonne, one will note the new and original arrangement of the chapels north of the choir, leaving between them and the side aisle a narrow aisle that produces a great effect by giving much lightness to the construction, without taking anything from the solidity. It

Troyes, etc. The nave of the cathedral of Clermont belongs to the 14 th century; that of the cathedral of Limoges in the 1 15 th and even in the 16 th,[1] as well as the gable wall of t the north transept. The history of the construction of these two monuments is then similar. The resources that the chapters and bishops of Clermont and of Limoges were able to collect about the end of the 13 th century for rebuilding their cathedrals were quickly exhausted, and at Limoges it was only at the end of the 15 th century, that the works were renewed, soon to be abandoned again.

Note 1. p. 374. The nave of the cathedral of Limoges remained unfinished like that of the cathedral of Clermont. At the west (Fig. 47) was allowed to remain the ruins of the old Romanesque nave and the substructure of the tower of the 11 th century, strengthened and extended upwards in the 13 th and 14 th centuries. (Art. Clocher).

At Narbonne, seat of an archbishop, the cathedral of S. Just, whose choir we still admire today, only rose from the ground about the last years of the 13 th century; but that edifice and those of Clermont and of Limoges, are noted for a remarkable difference in the style of the mouldings and the details of the construction. The cathedral of Narbonne was conceived according to the statements much larger than its two predecessors, but only saw its choir erected frsm 1272 ts about 1330. (48). [1]

Note 1. p. 375. This choir was also built nearly like those of Beauvais and of Cologne.

About that epoch Narbonne lost its old importance by reason of the filling of its port with sand. The cathedral remained unfinished; the transepts were not even built.[1] The construction of this vast choir is admirably treated by a wise man knowing perfectly all the resources of his art. It even seems that he first of all desired at Narbonne to make proof of knowledge. The capitals of the piers are entirely without sculpture; the triforium is of rare simplicity; but on the other hand the arrangement of the arches, the intersections of the mouldings and the profiles are executed with a perfection, t that yields in nothing to our edifices of the North. The vaults are admirably joented and constructed. Those of the chapels and side aisles, that receive a nearly horizontal stone roofing

The construction of the cathedral of Clermont was begun at the choir. The old Romanesque church had been left standing, its apse extending scarcely to the entrance of the new choir.[2] The sanctuary being completed about the end of the 13 th century, the Romanesque church was demolished excepting the western facade, and the work was constructed during the first y years of the 14 th century. Four bays of the nave were completed. The work was then suspended and never resumed, and one still sees the remains of the facade of the 11 th century.[3] The eastern part of the cathedral of Clermont, entirely built of lava from Volvic, is admirably constructed, although one perceives the extreme economy imposed on the master of the w work. Absence of the arcade in the substructures of the chapels, sculpture rare and no side arches of the vaslts. What is especially remarkable at Clermont as at Limoges and Narbonne, is the concession evidently made to southern traditions by t the architect from the North. Thus the side aisles are covered by stone terraces, although the triforium is not opened. The upper windows do not entirely fill the space between the piers but leave between them piers of a certain width, which is entirely contrary to the system adopted in all the churches of the North at that epoch. Two square chapels of the choir at the north are devoted to the service of the sacristy with treasury above.

Note 2. p. 372. By making some excavations, M. Malley, architect, has recovered exactly the plan of the cathedral of the 10 th and 11 th centuries, whose arrangement recalls those of the Romanesque of Auvergne.

Note 3. p. 372. Two towers yet remaining on this facade, b but that were altered long since, had to be demolished because they threatened to fall.

At the cathedral of Limoges, whose plan we give (47), at the south and in the same manner are placed the services taken at the expense of the two chapels. In the apsidal chapels of these two plans, that present not only the same arrangement but also similar dimensions, one will note the little entrance bay preceding the polygon; that is a system that we find adopted only in the apsidal chapels of the cathhdral of Rheims. Otherwise as at Rheims and Beauvais, the radiating chapels are all equal; there is no deeper chapel on the axis, as at Amiens,

an immense hall than a church with nave and side aisles. Nothing in the plan indicates either the choir or sanctuary. We are disposed to believe, that as at S. Pierre of Angouleme, towers were projected on the two transepts. A facade in the French style of the North was commenced about the middle of the 13 th century at the West, flanked by two little unfinished towers. The upper structures of this facade only date from the 14 th and 15 th centuries. In spite of its graudeur, the beauty of its architecture and of its details, we confess that this is a strange monument, an exception that found no imitators.

We give (45) the transverse section of the cathedral of Poitiers, whose vaults as at S. Maurice of Angers, rather approximate the ribbed dome than the groined vault. (Art. Voute). In the cathedral of Poitiers are united and mutually extinguished the plan and section of the Romanesque churches of Poitou with three aisles of equal height, the traditions of the construction of Byzantine domes.

After the middle of the 13 th century French fointed architecture imposed itself in all the provinces reunited to the crown, and even in some of those still only vassals. Except i in Provence and in some dioceses of the South provincial styles were effaced and the efforts of the bishops tended to erect cathedrals in the style of those, that formed the pride of the cities of the North.

From 1260 to 1275 we see three important cities of the South demolish their Romanesque cathedrals to erect edifices, whose direction was evidently entrusted to the same architect frsm the North, at Clermont in Auvergne, Limoges and Narbonne. These three dioceses commenced their cathedrals, the first in 1268 and the last in 1272, so that it is difficult not to see the hand of the same master in these three monuments. Yet perhaps the cathedral of Narbonne, while belonging to the same school as the two others, was erected by a different architect; but as for the cathedrals of Clermont and of Limoges, not only are these the same plans but the same mouldings, the same details of ornamentation, the same system of construction.

We present here (46) the plan of the cathedral of Clermont, the first in date.[1]

Note 1. p. 372. Like all other plans, this is at the scale of 1:1000.

Note 1. p. 388. See L'arch. Byz. en France, by M. Felix de Verneilh. Paris. 1854. p. 283 et seq.

S. Front of Perigueux was the origin of all monuments with domes built in the provinces of the West during a century.[1] But in Poitou and the provinces of the centre after the 11 th century was formed a school of constructors, whose method essentially differed from those adopted by the Roman-Bwzantine architects of the West or by those of the North. A great part of the Romanesque churches of Poitou, Limousin, Saintonge, Vendee and even Berry, possess a nave with side aisles, whose vaults attain nearly the same level, those of the narrower side aisles are tunnel or cross vaults, and serve to abut the central tunnel vaults. (Art. Architecture Religieuse, Fig. 12). Comformably to that principle are built the churches of S. Savin near Poitiers, of Notre Dame la Grande, of Melle, Surgere, S. Eutrope de Saintes, and even in distant provinces, of the city of Carcassonne in the 11 th century, of Brives and of Limoges in the 13 th. These three aisles of equal height if not in w width, only permitted windows in the walls of the side aisles, the central vault remainiug in darkness. This mode of construction was adopted for building the cathedral of Poitiers at the beginning of the 13 th century. Only the architect gave to its three aisles nearly equal widths, and the vaults were made pointed with ribs supporting the central crowns from the crowns of the transverse arches.

Note 1. p. 389. See the same work and Art. Architecture Religieuse.

Here (44) is the plan of the cathedral of Poitiers. There again in the arrangement as in the system of construction the influence of the North is null, although all the arches are equilateral, as in the cathedral of Angers; it makes itself f felt in the style of the mouldings and the oruamentation. Thanks to the width and height of the bays, to the great size of the twin windows opened below the arcade of the side aisles, this interior is very light. The transepts indeed are only o orientated lateral chapels, and the apses being traced in a curve with little emphasis, do not appear externally.

From outside the cathedral of Poitiers, covered by a roof with two slopes, terminated at the East by an enormous gable wall without projection and scarcely with openings to be rather

rebuilding of mose of the Romanesque cathedrals was caused by fires, as if this scourge had desired to come to the aid of the tendencies of the episcopate and of the urban peoples.

At Angouleme the cathedral had been built at the beginning of the 12 th century, composed of a nave with four domes, an apse and four radiating chapels.(44). About the middle of that century, when on a great part of the territory of modern France were erected or thought of erecting new and larger cathedrals, they were satisfied with enlarging the cathedral of Angouleme by the addition of two transepts surmounted by two t towers,[1] and they enriched the interior of the nave by adding engaged columns and some architectural details. The western facade was rebuilt and covered with sculpture. Of the primitive church only the first bay of the nave remains intact. On the exterior of the crossing parts were rebuilt.

We give (42) at A a section through the north transept of that church and at B the transverse section of the nave.[2] The additions and the repairs of the primitive church of S. Pierre of Angouleme did not change the system of construction. The R Romanesque tradition is retained pure. In approaching the provinces of the North the Byzantine style of the churches of the West from the middle of the 12 th century suffered from the influence of the schools of Ile-de-France and of Picardy.

Note 2. p. 367. We owe these drowings to our friend, M. Abadie, architect of the cathedral of Angouleme, who has just completed with as much good fortune and talent the removal and r restoration in detail of the beautiful tower, whose section we give.

From 1145 to 1165 was built at Angers the nave of the cathedral.[1] The plan of this nave (43) approaches somewhat to t that of the nave of the Cathedral of Angouleme (Fig. 41). But at S. Maurice of Angers the dome yields to the cross vault. At the beginniug of the 13 th century were erected the transepts and the choir in still following the system adopted in the 12 th. The architecture of the North imposes here neither its ar- arrangement of plan, nor even its system of construction; for these cross vaults are rather ribbed domes than pointed vaults. (Art. Voute). The diagonal ribs are a decoration rather than a means of construction. No side aisles, chapels, one nave, transepts and one sanctuary.

the end of the 12 th century, develop with the royal power a and penetrate as a result of its conquests or by the aid of its political influence, in the adjacent provinces of Ile-de-France. That revolution was accomplished in the course of a few years, i.e., during the reign of Philip August. But until the end of the 13 th century it did not extend outside the t territory that we have just passed over. In the other provinces at the South and West Romanesque architecture peacefully followed its national course; if it was modified, this was not modified in its principle, but in details of its ornamentation.

The abbey church of S. Front at Perigueux had been erected about the end of the 10 th century in imitation of the church of S. Mark of Venice.(Art. Architecture Religieuse). A little later or perhaps at the same time was built the cathedral church of Perigueux [1] and the cathedral of Cahors, both without transepts and originally presenting only a single aisle with apse.

We give (40) the plan of the last edifice. It is composed of two domes borne on six great piers, eight pendentives and transverse arches. The apse is covered by a half dome, and t three little chapels open in the wall of the sanctuary.

The abbey church of S. Front was larger and richer than the two poor cathedrals of Cahors and of the city of Perigueux, ~~and not the present cathedral.~~

Note 1. p. 366. We mean here the old cathedral of Perigueux reestablished in the abbey church of S. Front, and not the p resent cathedral.

In the provinces of the West as in Burgundy, Champagne and Normandy, the abbey churches during the 10 th and 11 th centuries drew all to them; but if in the provinces of the centre and the West, the episcopal renewal was less active in the 12 th century than in the North and East, yet it made great efforts without finding that a school of lay architects all ready to second it, and in the people a pronounced desire to make itself a national body. Besides, the Romanesque architecture of those last provinces had adopted for its religious monuments a durable and solid mode of construction, that excluded carpentry, and consequently removed the causes of fire;-- we see in the North at the end of the 12 th century, that the rebuild-

been restored by M.M. Demarets and Barthelemy with a care and perfection, that do the greatest honor to those two architects.

But the cathedral of the 13 th century, whose primitive arrangements were changed at the beginning of the 14 th century, further suffered important changes, that unfortunately were not so happy as those just mentioned. In 1430 the canons caused the enlargement of the windows in the choir, not from necessity, but because as Pommeraye says,[2] the choir appeared "gloomy and dark." The windows of the nave were likewise modified during the 15 th century. In 1485 was commenced the construction of the tower flanking the portal at the South under the name of the Butter tower.[3] Cardinal George d'Amboise began t the rebuilding of the western facade, that was never completed. Already in the 13 th century existed over the four piers of the crossing a high tower, of which two stories still remain; injured by wind in 1353, then repaired and burned in 1514 by carelessness of plumbers; the upper story of that tower was rebuilt and surmounted by a great spire of wood covered by l lead, that was only finished in 1544. Lightning set it on fire in 1821, and it has been replaced in our days by a spire of cast iron.[4]

Note 2. p. 365. Hist. de l'egl. cath. de Rouen. 1686. Rouen.

Note 3. p. 36ɒ. "Everyone knows,"(says Pommeraye in his Hist. de l'egl. cath. de Rouen, p. 35) that it had this name because of the permission that cardinal William d'Estouteville obtained for the faithful in the diocese of Rouen and Evreux to use butter and milk during Lent. Robert de Croismare (archbishop of Rouen) destined to the building of that tower all the money offered by the faithful in recognition of that favor. The tower was only finished in 1507."

Note 4. p. 365. As a result of the fire of 1821, a part of the covering of the great roof and of the vaults of the nave were replaced anew.

The dependances of the cathedral of Rouen were considerable, and under its shadow, the archbishop's palace, a beautiful c cloister, schools, libraries, sacristies, chapter halls and treasuries, were successively grouped on the north and south sides. There still remain beautiful fragments of these different buidings. (Art. Cloitre).

Until now we have seen the architecture, born in France at

floor of the gallery of the second story, and the high vaults of this gallery become vaults of the side aisles; the windows of that gallery are omitted and those of the ground floor are joined, thus forming unusually long openings.

The nave of the cathedral of Rouen is several years earlier than that of the church of Eu. Was it desired in the later edifice to imitate the arrangement adopted at Rouen only in the effect produced (the space under the archivolts of the nave of the church of Eu being useless, since one cannot communicate from one to the other, while at Rouen they form a gallery?). This is probable. Whatever the motive that directed the architect of the cathedral of Rouen, the arrangement of its nave was not imitated elsewhere in Normandy, and in that province, where pointed art was freed from French influence and had acquired its own character, one no longer sees vaulted galleries in the second story, nor anything recalling them; a simple triforium crowns the archivolts of the side aisles.

The cathedral of Rouen was rebuilt almost entirely in the French pointed style, and was completed above the level of the vaults of the side aisles in the pointed Norman style. The four towers that flank the transepts, the windows, cornices and upper balustrades are Norman. But the nave of the cathedral of Rouen, like all the naves of the French cathedrals at the beginning of the 13 th century, was without chapels. At the end of that century some were constructed between the buttresses (39), as at the cathedral of Paris. In 1302 was begun the rebuilding of the chapel of the Virgin located on the axis of the chevet by giving it great dimensions, instead of the chapel of the 12 th century, that was no larger than the two other apsidal chapels now existing. About that epoch were rebuilt the two north and south gable walls of the transepts.(Portal of the assembly, portal of the library). These works from the beginning of the 14 th century surpass in richness and beauty of execution all that we know of this kind from that epoch.

Then Normandy possessed a school of constructors, of stonecutters and of sculptors, that equals the school of Ile-de-France.

The portals of the assembly and of the library, the chapel of the Virgin of the cathedral of Rouen, are masterpieces.[1]

Note 1. p. 365. The portal of the library (north) has just

architecture attained its puberty, so to speak, on leaving i its domain it stifled the provincial schools; if it sometimes respects certain traditions, certain local customs, that only influence the general composition of the plans, it imposes a all that it has in art; proportions, construction, arrangement of details and the decoration. This sort of tyranny did not last long, for from 1220 to 1230 we see Norman architecture wake and possess itself of the pointed style to appropriate it, as a conquered people soon changes a language imposed on it to make it a patois. Let us say at once, to not rouse against us not only Normandy but all England, that the pointed patois of those countries has beauties and original qualities, that place it above other derivatives, and that can almost m make it pass for a language. But we shall have occasion to d develop our idea at the end of this Article. Yet the cathedral of Rouen, rebuilt at the beginning of the 13 th century, adopted certain arrangements, that indicate a singular hesitation on the part of the architects, probably French, called to execute the new works. In the nave the master of works seems to have desired to design a gallery in the second story, as in nearly all great churches of France and Soissonais, but stopped halfway, and instead of a vaulted gallery made a simple passage on the arches turned below the archivolts of the side aisles, and continued around the pier, (Art. Galerie), by means of little columns borne on corbels.

In the church of Eu is the same singularity, but perfectly explained. The choir, transepts and the last bay of the nave of that edifice were erected after the first years of the conquest by Philip August, i.e., from 1205 to 1210, in the perfectly pure French style with a vaulted gallery in the second story as at Notre Dame of Paris. From about 1210 to 1220 was an interruption; from 1220 to 1230 a resumption of the works; the nave is continued according to the primitive arrangement, i.e., all is prepared to receive a vaulted gallery in the second story over the side aisles; but already the abacuses of t the capitals and the plinths of the bases are circular, the ornaments and mouldings have become Norman; they in building they changed, the capitals are cut to receive the vaults forming the gallery, but there are left only the arches lengthwise the nave between the piers; no vaults are built to serve as

The diocese in which the mixture of the Norman and French styles is most complete should be and indeed the diocese of Rouen. The cathedral of Rouen already occupied in the 12 th century the entire area of ground, that it occupies today. Rebuilt for the third time duing the course of the 11 th century, it was entirely rebuilt during the second half of the 12 th century in the Norman transition styles.

Of these structures (39) there remains only the tower called S. Romain, that rises at the North portal, the two chapels of the apse, those of the transepts and the two doorways of the western portal, the two chapels of the apse, those of the transepts and the two doorways of the facade opening into the two side aisles; the latter works even appear to belong in t the later years of the 1? th century. Therefore when Richard the Lionheart died in 1199, the cathedral of Rouen already h had the present extent.

In 1204 Philip August tore Normandy from the hands of John Lackland, and he reunited to the crown of France that beautiful province as well as Anjou, Maine and Touraine, with a part of Poitou. A little later great works were undertaken in the cathedral of Rouen. The nave, transepts and sanctuary must be rebuilt after a fire, that probably seriously damaged the church of the 12 th century. There as in all other French dioceses, arose a cathedral at the beginning of the 13 th century under the monarchical power, and a remarkable thing at Rouen, the structures that appear to have been erected under the reign of Philip August, i.e., from 1210 to about 1220, belong to the French style, while those dating from the middle of t the 13 th century are impressed by the Norman pointed style. This curious fact, inscribed even more clearly in the church of Eu, is of great importance for the study of the history of our national architecture.

Normandy possessed during the entire Romanesque and transition periods, i.e., from the 11 th to the 13 th centuries its own architecture, whose characteristics are perfectly clear. In edifices erected during this lapse of time, the arrangement of plans, construction, ornamentation and proportions of Norman architecture, are distinct from those of the adjacent provinces, Ile-de-France, Picardy, Anjou and Poitou.

At the beginning of the 13 th century, when pointed archit-

cathedral of Coutances, let us say, was entirely rebuilt after the first years of the 13 th century. The choir with its radiating chapels, that recall those of the choir of the cathedral of Chartres, appears to have been founded about the end of the reign of Philip August. The construction of the nave must have almost immediately followed that of the sanctuary; but it is probable that the transepts were erected on the old Romanesque foundations of the 11 th century, and that even t the enormous pieces of the crowning only enclosed a nucleus of Romanesque construction as at Bayeux.

Indeed if we examine the plan (38) of that part of the edifice, we find there a sort of restraint in the entirety of the arrangement, and the well marked trace of the Norman chapels of the transepts. Whatever the load that the master of the w works desired the four piers of the crossing to support (indeed an enormous load), it appears difficult to us to admit, that in the full 13 th century, if it had not been required by preceding constructions, he had not shown more skill in t that important part of his project. However that may be, there remain no visible traces of Romanesque construction in the cathedral of Coutances; it is an edifice entirely in pure pointed style; the chapel of the Virgin at the extremity of the apse, and the chapels of the nave alone were added later in the 14 th century.[1] The western facade is surmounted by two towers with stone spires, beneath which, besides the principal portals, open tuo lateral porches at North and South with a grand effect. That central tower, which certainly should be crowned by a spire, remained unfinished. At the two ends of t the transepts are attached at the south a chapel, at the north being a vast sacristy. One finds also at Coutances before the radiating chapels two small square Norman towers, which as at Bayeux contain stairways and separate so happily the apse from the choir properly so called. In style of architecture the c cathedral of Coutances is entirely Norman.

Note 1. p. 360. The chapels of the nave present an arrangement so beautiful and so rare, that we have believed, that t they should be given on this plan, although they disguise the primitive arrangement. These chapels are connected together at a height of about 10 ft. by openings or tracery without glass; this is like a side aisle divided by low cross partitions.

completed during the last (18th) century by a dome with a l lantern. These four piers of the crossing were successively e enclosed by facings during the 13 th and 14 th centuries.[1] T There will be noted the arrangement of the Romanesque towers of the western facade; they are entirely closed in the ground story and support from the foundation, that is a Norman arrangement, that we find again at Rouen, even at Chartres, also indicated at Seez and at Coutances. (Art. Clocher).[2]

Note 1. p. 359. Because of these successive constructions, further made with materials of small resistance, such serious crushing has appeared in the four points of support, under the load they have to support, that it has been necessary to build centres under the four transverse arches, shore the piers, and proceed with the demolition of the upper parts.

Note 2. p. 359. The cathedral of Bayeux still possesses at both sides of the choir its sacristies and treasury, and at the North of the western facade is a beautiful chapter hall of the 13 th century. (Art. Salle Capitulaire).

At Bayeux in the style of the architecture is no longer a trace of the influence of French architecture. The Norman mode alone dominates; it is that we find at Westminster, Lincoln, Salisbury and Ely in England, and yet in arrangement of the plan, the cathedral of Bayeux approaches more the French cathedrals of the 13 th century, at least in its eastern portion, than the English cathedrals. This is because in the 13 th century, if Normandy possessed its own style of architecture, it then suffered the influence of the edifices of the royal domain.

The cathedral of Dol in Brittany alone appears to be completely freed from the empire exercised over the entire western territory of the continent, by the arrangements of plan adopted at the end of the reign of Philip August, in the construction of cathedrals. The cathedral of Dol is terminated at the east by a rectangular wall, in which are found great windows, like the cathedrals of Ely and of Lincoln.

The cathedral of Coutances was founded in 1030 and completed in 1083, and whether it threatened ruin like most cathedrals of the North at that epoch, it appeared insufficient, or finally that the diocese of Coutances being recently reunited to the crown of France, desired to enter into the great movement then ade to rebuild all cathedrals North of the Loire; the

foundations, about the end of the 14 th century it was thought necessary to strengthen the external buttresses of the choir; but these additions themselves were badly founded, and again contributed by their weight to iujure the light structure of the 13 th century, which thenceforth only opened more and more. At the beginning of our (19 th) century, the great vaults of the sanctuary fell; it was necessary to rebuild them of wood.

The facade of the cathedral of Seez is crowned by two towers with spires erected at the beginning of the 13 th century and repaired or rebuilt during the 14 th and 15 th centuries. These towers as well as the entire nave have made very serious movements because of the insufficiency of the foundations. It is today a strongly compromised monument.[1]

Note 1. p. 358. Unfortunate restorations were undertaken f from 1818 to 1848 on the facade and around the nave of the cathedral of Seez; they only made worse a state of things already very dangerous. Works executed with intelligence and care from that epoch permit the hope that this remarkable edifice can be saved from ruin, by which it has been menaced for a long time.

We shall not leave Normandy without speaking of the cathedrals of Bayeux and of Coutances.

The cathedral of Bayeux, whose plan we give (37), is an edifice of the 13 th century grafted on a church of the 12 th; and from the 12 th century remain only the piers, the archivolts and the tympanums of the ground story of the nave. As at Mans and at Seez the transepts are simple and without side aisles; at Bayeux two chapels of small depth, whose trace we likewise find in the eastern wall of the south transept of t the cathedral of Seez, open at the east into the north and south transepts. These are a last memorial of the Romanesque chapels of the Norman transepts, that are seen developed in the primitive plan of Mans(Fig. 34). Again at Bayeux in the p plan of the choir of the 13 th century are seen the two Norman towers (at a small scale, since they only contain stairways), that terminate the series of square chapels before the apsidal chapels.[2] On the facade are two great Romanesque towers with spires. On the four piers of the crossing existed a tower from the 12 th century; it was rebuilt in the 13 th, t then continued during the 14 th and 15 th centuries, to be c

Mans thought of rebuilding the nave in the same style; the w work stopped at the transepts, and if the monument thereby l loses unity, the history of the art gains very precious remains of the primitive cathedral.

Note 1. p. 356. The unusual position of this tower can only be explained by determining at the end of the 13 th century to not extend beyond the transepts the new constructions, and to retain the Romanesque nave restored in the 12 th century. In the primitive church, whose plan we have given in Fig. 34, the single tower should be placed on the four piers of the crossing according to the Norman method. Demolished when the choir was rebuilt, and renouncing entire reconstruction, no o other place was found to receive the towers than the end of the south transept.

At Mans the chapel of the Virgin in the axis is much deeper than its neighbors, and it rises over a crypt into which one descends by a little private stairway. This arrangement of t the deep apsidal chapels, the central one being emphasized by one or two bays more than the others, is likewise found in t the choir of Seez. That edifice is entirely in the Norman style in the nave, that dates from the first years of the 13 th century, and approaches the French style in its eastern portion; it can be classed among those erected with insufficient resources, like Troyes, Chalons-sur-Marne, Meaux, and had no foundations or bad ones. The nave (36) was built at the beginning of the 13 th century, and was rebuilt in its upper parts 50 or 60 years after its construction; the choir was erected about 1230 and almost entirely destroyed by a fire, must be rebuilt about 1260 from ground to roof, except the chapel of the Virgin, that it was judged should be preserved. The master of the works of the choir, founded only on very insufficient masonry, had sought to reduce the danger of such a situation by the extreme lightness of his structure; and considering even the choir of the cathedral of Seez from that point of view, it merits being studied. The deep apsidal chapels present extended radiating walls, and further lend themselves to a light and well spread construction. Indeed the internal bays of the sanctuary have a lightness that exceeds everything attempted in that way (Art. Travee), and the construction in e elevation is most wise; yet nothing can replace good foundat-

understood that for the drawing of the principal apses we have had only very vague data. But we present this plan as a type rather than as a particular edifice.

The cathedral of Peterborough in England of a more recent date, but which however for nearly its entire extent precedes the 12 th century, still presents an arrangement analogous to this.

During the 12 th century, about the epoch when were erected the churches of the abbey of S. Denis and of Notre Dame of N Noyon, the Romanesque nave of the cathedral of Mans was rebuilt; the piers of the upper parts of the nave were retained, this being vaulted as well as the transepts. These vaults approach in construction, not the system adopted in Ile-de-France aud Soissonais, but that derived from the domes of the churches of the West. (Art. Voute). A doorway decorated by sculptures and statues with the greatest analogy to those of the royal portal of Chartres was opened at the middle of the nave at the South.(35). Men were not contented by these important changes. About 1220 the old apses were demolished, and the admirable choir was constructed, that we see reproduced in the plan. But then Maine had just been reunited to the royal domain. The diocese of Mans paid its welcome by rebuilding a choir, that itself covered an area of ground greater than all the rest of the old cathedral.

The choir of the cathedral of Mans, if not for the unusual depth of the apsidal chapels, presented an arrangement absolutely similar to that of the cathedral of Bourges, i.e., it possessed two rows of galleries; the first side aisle being much higher than the second allowed the opening of windows a and a triforium in the wall separatingthe two side aisles above the archivolts. But the construction and arrangement of t the chapels, the details of the architecture are much more b beautiful at Mans than at Bourges. The exteriors are treated in a remarkable manner and with luxury, and do not permit to be seen the poverty of means like the cathedral of Bourges. A beautiful sacristy opens at the south; it likewise dates from the 13 th century. The two gable walls of the transepts, the single bell tower [1] built at the end of the south transept, were only completed in the 14 th century. It is to be believed that the master of the work of the choir of the cathedral of

undertaken under the reign of Louis XIV completely denatured what remained of the monument of the 13 th century. Yet one can still easily recognize the primitive plan grafted on a Romanesque edifice.

Not being able to occupy ourselves with the admirable cathedrals of Cambray and of Arras,[1] now destroyed, and that could furnish precious information on the fusion of the Rhenish school with the French school, we shall make a digression to t the provinces of the northwest and west.

Note 1. p. 354. The beautiful cathedral of Arras was destroyed only after the revolution of 1792; it still existed at the beginniug of that century. That of Cambray was the work of Vilars of Honnecourt, the master mentioned several times by us, the friend of Robert of Coucy. Vienne possesses a model of that cathedral dependent on the plan in relief taken from the Museum of the Invalids by the Austrian generals.

In the North vaults appeared slowly; the great churches in the centre of France, of the provinces of the East and West were already vaulted in the 11 th century, when the principal naves of the churches were covered by visible carpentry in p part of Picardy and of Champagne, Normandy, Maine and Brittany.

During the 11 th century Normandy and Maine were not reunited to the royal domain, and although the dukes of Normandy held their province as a fief of the crown, each one knew how little they recognized the suzerainty of the kings of France. What remains of the Norman cathedrals of the 11 th and 12 th centuries in England and on the continent, gives reason to s suppose that these monuments, whose plans considerable approach the Roman basilica, were in great part covered by wooden ceilings; vaults only appeared on the side aisles and the sanctuaries. The old cathedral of Mans was constructed on that principle at the beginning of the 11 th century. We give its plan.(34).[2] The side aisles A were covered by Roman cross vaults, the apses by half domes, and the transepts B and the n nave C by wooden ceilings. On the four piers of the crossing in the Norman churches always rose a high tower borne by four transverse arches. At the main western facade still exists as well as the side walls and the base of the gable wall of the north transept. The joinings of the little apses E are visible.

Note 2. p. 354. This plan is at a scale of 1:1000. It is un-

in completion.

William de Seignelay, on taking possession of the episcopal throne of Paris in 1220, left quite important sums for continuing the work; his successor, Henry de Villeneuve, who died in 1234, appears to have finished the undertaking, this is t the opinion of Abbe Lebeuf,[2] an opinion in accord with the s style of that part of the cathedral. As for the transepts and the nave of S. Etienne of Auxerre begun about the end of the 13 th century, they were completed during the 14 th or 15 th centuries. The western facade remained incomplete; the north tower alone was finished about the beginning of the 16 th century.

Note 2. p. 352. Mem. conc. l'hist. civ. et eccles. d'Auxerre, by abbe Lebeuf. 1848. Vol. 1. p. 402 et seq. For the internal arrangements of the edifice of the 13 th century, see Art. C construction. These arrangements frankly belong to the Burgundian school.

If the southern dioceses of Champagne suffered the influence of Burgundian arts, one of those in the North took certain a arrangements from the religious edifices on the banks of the Rhine. At the beginning of the 13 th century was rebuilt the cathedral of Chalons-sur-Marne, whose sanctuary (33) was without side aisles, and whose elongated transepts were accompanied at the east by two square chapels, two little sacristies and towers, remaining of a Romanesque edifice. We cannot know if, as in Rhenish churches, the nave was terminated at the w uest by traysepts and a second apse; we should be tempted to believe it in examining the Rhenish arrangement of the plan at the eastern end.[1] Yet if the cathedral of Chalons-sur-Marne recalls in plan of its chevet that of Verdun, for example, which is entirely Rhenish, the details, the system of construction and ornamentation approach the school of Rheims. This is an exceptional monument, a sort of bond between two very different styles, but which is reduced to a single example.

Note 1. p. 353. In the 14 th century a circular side aisle and chapels were built around the sanctuary of Chalons, and the nave was almost entirely rebuilt. The western part of that cathedral dates from the last (18) th century. After a fire that caused the most serious damages to that edifice, oud which destroyed the vault of the sanctuary, a restoration under-

construction and that of Langres as a last reflection of Roman antiquity. What characterizes the cathedral of Sens is especially the single apsidal chapel and the two little apses of the transepts. Although Sens and langres depended on Champagne, these two churches belong much less to that province, than to Burgundy in the arrangement and style of architecture.

We shall find the proof in the substructures of the cathedral of Auxerre. The cathedral of Auxerre was rebuilt after a fire by bishop Hugues about 1030, and possessed a circular s sanctuary with side aisles and a single chapel on the axis; the crypt of that church still exists today, and from that p point of view is of the greatest interest. We give the plan here (32),[1] omitting the external buttresses added in the 13 th century. In comparing this plan of the crypt with the plan of the choir and the chevet of the cathedral of Langres, and particularly with that of Sens, it is easy to recognize the degree of intimate relationship connecting these thre edifices, erected at very different epochs; and one can conclude f from this examination, we believe, that the dioceses of Autun, Langres, Auxerre and Sens, possessed after the 11 th century certain arrangements of plan peculiar to them, and that were adopted in the eastern part of the cathedral of Canterbury.

Note 1. p. 352. At the scale of 1:1000.

We shall again find the traces of this school in the 13 th century at Auxerre itself. In 1215 the bishop William de Seignelay commenced the reconstruction of the entire eastern part of the cathedral of Auxerre; the old crypt was retained, and on its perimeter, increased only by the projection of some buttresses, was erected the new apse. On the little apsidal chapel of the crypt was built a single square chapel on the axis, strengthening it on the exterior by piers the little s semicircle of the 11 th century.(Fig. 32).

Certainly at that epoch, if men had not regarded this form of plan as consecrated by custom, even in retaining the crypt, they could have extended outside of its perimeter as at Chartres, either to erect a second side aisle, or to open a great number of apsidal chapels. The plan of the 11 th century was retained, and the choir of the cathedral of Auxerre of the 13 th century resepected its traditional form. Yet the construction of the choir of S. Etienne of Auxerre was quite long

suffered by all our French cathedrals except those of Rheims and Chartres, and had as a result the weakening of the external points of support, and of rendering the discharge of water difficult. About 1260 the south tower of the facade fell on the beautiful hall of the synod built about 1240 at C; that tower was rebuilt at the end of the 13 th century and only finished in the 16 th century. The north tower was erected a about the end of the 12 th century, and was only terminated by the belfry of wood covered by lead built about the beginning of the 14 th century.[1] At the beginning of the 16 th century the gable wall of the south transept, that dated from the 13 th century, was restored in its upper portion; that of the north was completely rebuilt; the upper windows of the transepts were rebuilt with their windows; finally two chapels of irregular form were joined to the sides of the side a aisle of the apse at the end of the 16 th and in the 17 th centuries. A treasury and sacristies communicating with the archbishop's palace were erected at B. The principal entrance of the palace of the archbishop was under the hall of the synod at A.

Note 1. p. 351. This belfry no longer exists; it was removed because of decay a dozen years since.

In the cathedral of Sens the round arch is mixed with the pointed arch, as in the choir of the cathedral of Canterbury. That is again there the influeuce of the Burgundian school.

The structures completed in 1168 must have stopped at the second bay of the nave. The oldest parts of the facade do not date before the last years of the 12 th century; there remain from that epoch only the two middle and north doorways and the truncated north tower. On the interior and the exterior at that point is an incomprehensible mixture of constructions rebuilt during the 13 th, 14 th and 15 th centuries.

What remains of the stained glass of the beginning of the 13 th century and of the 16 th in the cathedral of Sens is very remarkable. (Art. Vitrail).

S. Etienne of Sens is a cathedral by itself in plan and style of architecture; contemporaneous with the cathedral of Noyon, it has not the refinement and elegance of that. In spite of the adoption of the new system of architecture, one finds there the breadth of Romanesque and Burgundian con-

we give at the level of the gallery of the ground story (31), although erected by an English architect, still retains all the characters of the apse of the cathedral of Sens, not only in its plan but in its construction, its mouldings aud its ornamental sculpture, with more refinement and lightness; which is explained by the interval of some years separating the two structures. William the Englishman, we believe, had only to follow the projects of his unfortunate predecessor, who c could well be the master of the work of the cathedral of Sens. The chevet of the cathedral of Canterbury gives us the means of restoring the chevet of the cathedral of Sens, as we have done. (Fig. 30).[1]

Note 1. p. 350. The only disputable part of this restoration would be the circular chapel on the axis, replaced by a d deeper chapel erected after the fire at the end of the 13 th century. But there is so much analogy between the chevet of Canterbury and that of Sens, that we are strongly disposed to believe that Becket's crown is only an imitation of a similar chapel built at Sens by master William before his departure to England. Do not forget that in 1168 the cathedral of Sens was finished, and that in 1175 William commenced the construction of the choir of Canterbury. For more ample statements on this subject, we referrour readers to the excellent work of Professor Willis.

What characterizes the cathedral of Sens is the breadth and the simplicity of the general arrangement. The nave is wide, the supports are resistant, built only under the springings of the great vaults; the choir is vast and deep. The architect knew how to combine the masculine grandeur of Burgundian churches of the 12 th century with the new forms adopted by Ile-de-France. But it is unnecessary to believe that this monument remains to us as left by the bishop Hugues de Toucy. Devastated by a fire about the middle of the 12 th century, the vaults, upper windows and the cornice were rebuilt, then the apsidal chapel. Columns were added between the coupled columns of the semicircle to support from the ground the archivolts, as at Canterbury, that must rest on corbels projecting between the two capitals. (Art. Pile).

At the end of that century were built the chapels between the buttresses of the nave; that unfortunate operation was

history of their great monuments of the middle ages. Documents abound with them and have long been collected with care; thanks to that spirit of conservation, we shall find at Canterbury the history of the cathedral of Sens.

In 1174 a fire destroyed the choir and the sanctuary of the cathedral of Canterbury; the following year after the ruins of the burned portion had been removed, and the stalls had b been temporarily established in the old nave, the new choir was commenced. The work was entrusted to a certain William of Sens.[2] That master of the works left England only in 1179, as the result of a fall on tne works, after having erected the front part of the new choir and the two eastern transepts.[3] Before leaving, beiug wounded and unable to leave his bed, William of Sens seeing the winter approaching, and not desiring to leave the great vault unfinished, gave the conduct of the work to a skilful and judicious monk, who had served him as foreman of the works. Then could be completed the vaults of the crossing and of the two eastern transepts.

Note 2. p. 349. It should not be forgotten, that the cathedral of Canterbury retained subsequent relations with France. Lanfranc and S. Anselm, both Lombards and both from the abbey of Bec in Normandy, successively became archbishops of Canterburw, primates of England. S. Thomas Becket dwelt long at Pontigny and at Sens; the treasury of this cathedral long preserved his episcopal vestments.

Note 3. p. 349. The cathedral of Canterbury has doubled transepts; the western ones belong to the primitive basilica! t those of the east belong to the construction begun by William of Sens. (See Architectural History of Canterbury Cathedral, by professor Willis, from which we borrow this curious passage, that the author himself extracted from the Chronicle of Gervase.

"But the master, perceiving that he received no benefit from the physician, abandoned the work, and crossing the sea, returned to his place in France. Another succeded him in the direction of the works, William by name, English by nation, small in body but honest and skilful in all sorts of arts." It was this second master, English by nation, who completed the choir and chevet, the chapel of the Trinity and the chapel called Becket's crown. Now this eastern end, a plan of which

We present the plan (30) of the cathedral of Sens,[1] completed at the end of the 12 th century. Comparing the choir of t this cathedral with that of Langres, one finds a certain analogy between the two. The sanctuary is surrounded by a side ai-aisle; a single chapel is arranged on the axis; in the apses on the transepts, found in embryo at Langres, are developed at Sens. In the details are also found points of connection between the two edifices. For example, the pointed arches, t the vaults of the side aisles, at Sens as at Langres rest on corbels arranged above the capitals, which receive only the springings of the archivolts an of the transverse arches.

Note 1. p. 348. Ar tho scale of 1:1000.

But at Sens are more fluted pilasters; already the system of the French vault is adopted in the side aisles.[1] Around the sanctuary is no longer as at Langres a simple row of colunms bearing the upper parts, but of columns coupled on the radii of the curve, and piers composed of clusters of little columns. This system of coupled columns between the stronger piers is reproduced in all the interior work of the cathedral of S Sens, and is perfectly adapted to the combination of the vaults with diagonal arches extended in two bays, it is an arrangement analogous to that of the nave of the cathedral of Noyon, and which was generally adopted in the churches of Tle-de-france of the end of the 12 th century. Unfortunately the cathedral of Sens soon suffered serious modifications; reconstructions and later additionsmade to its structure profoundly changed its beautiful primary arrangements. To properly render an account of the primitive edifice, it is necessary to p pass the Manche and go to Canterbury.

Note 1. p. 349. We do not speak of the high vaults of the choir and of the nave, that in the cathedral of Sens were rebuilt about the end of the 13 th century as the result of a fire.

We possess no exact data in the foundation of the existing cathedral of Sens, and the name of the master of the work is unknown. I may say that it is only known, that its construction was in full activity under the episcopate of Hugues de T Toucy fsom 1144 to 1168, dates that perfectly accord with the archaeological character of the monument. Our neighbors of o over the sea are more careful than we, when it concerns the

a single chapel exists at the apse;[3] in the eastern walls of the transepts open two little apses. The semicircle was again vaulted in a half dome; but in the bay preceding it and in t the circular side aisle appear cross vaults with diagonal arches. The windows and gables have round arches, all the archivolts, side and transverse arches are equilateral. (Art. Voute). Flying buttresses date from the primitive structure and abut the thrusts transferred to the butresses.

Note 3. p. 345. This circular side aisle was surrounded in the 15 th century by formless chapels; but one easily finds over the vaults of these chapels, very lightly constructed, the primitive arrangement of the side aisles.

The choir of the cathedral of Langres dates from the second half of the 12 th century; the nave from the last years of t that century or the first of the 13 th. We present (29) the transverse section of this monument. On examining this section it is easy to see, that these are all the elements of a developing art, simple anf wise arrangements. If the cathedral of Autun with its great pointed tunnel vault without flying buttresses did not offer sufficient conditions of stability,[1] at Langres the problem was solved, and the conditions of stability are excellent.

Note 1. p. 346. Although the cathedral of Autun was built of excellent materials, well cut and of large size, set with care, the great pointed tunnel vault pushed out the lateral walls immediately after removing the centering; these walls must be sustained by flying buttresses, that were rebuilt or repaired in the 15 th centurw. Ten years since it was necessary to rebuild the great vaults in steel and terra cotta; t they threatened ruin.

This school of constructors, whose works we have found at Charite-sur-Loire, in the porch of Vezelay, in that of Cluny, in the beautiful church of Montreale, in a great part of Lyonnais, of Burgundy and of lower Champagne, rose parellel to t the school from Ile-de-France; it was absorbed by that.

The cathedral of Langres is the last original expression of that branch of pointed art coming from the provinces of the southeast; the two branches meet at Sens to unite and produce an edifice of a special character, but still where the French influence predominates.

that bold and rash spirit of the people of Ile-de-France, Champagne and Picardy. Wiser and more circumspect, the inhabitants near the Loire erected their monuments only within the limits of their resources. The cathedral of Tours in its restricted dimensions is a remarkable example of this.

This charming edifice is executed with very particular care; one sees in none of its parts those negligences so common in our great cathedrals of the North. The cathedrals of Chrtres and of Amiens in particular seem to have been erected with a haste like fever; when one passes around in those edifices, it appears that their architects may have had a presentiment of the small duration of that impulse which they obeyed. At Tours one feels the study, care and slowness in execution; the choir of the cathedral is the work of a calm mind, that possesses its art and only executes in view of the resources of which it can dispose. One can say that this graceful monument follows step by step the programme of the art of its time; but also one does not feel there the inspiration of genius, that conceives in advance of execution, which animates the stone and continually subjects it to new ideas.

It is necessary for us to return on our steps to take up at its source another branch of the grand relegious structures of the 13 th century. At Autun still exists a cathedral built about the middle of the 12 th centurw; this monument recalls the relegious structures of Cluny: it was erected under the influence of the churches of that order and of the Roman traditions still alive in that city.

Its plan, that we give here (27), covers an area of moderate extent;[1] it is of great simplicity; the nave and the side aisles end in three great semicircular apses; the principal aisle is covered by a tunnel vault with transverse arches: i its side aisles have cross vaults without diagonal arches.[2] A vast porch was built a short time after the construction of the nave, and precedes it as in the Cluniac churches.

Note 1. p. 345. This plan is at the scale of 1:1000. The c cathedral of Autun is badly orientated; the apse is turned toward the southeast.

Note 2. p. 345. See Art. Architecture Religieuse, Fig. 20.

This edifice produced another, the cathedral of Langres, (28). At Langres the side aisle extends around the sanctuary;

centuries are solidly founded and wisely combined.[1]

Note 1. p. 343. In 1845 it was necessary to rebuild the gable wall of the south transept, which had partly fallen; already in the 15 th century had been strengthened that on the north. In 1849 it was necessary to shore the vaults of the c choir, and since that epoch underpinning the foundations has been executed with great skill; the chapels were restored, a and now all the upper part of the sanctuary is being rebuilt.

The choir of the cathedral of Troyes presents some peculiarities,that must be mentioned.(Fig. 25). If the chapel of the Virgin (in the axis of the apse) is not as deep as at Amiens, yet it is distinguished from the four other apsidal chapels; it possesses two bays before the semicircle instead of a single one. On the north side two smaller chapels open at the end of the side aisles before the apsidal chapels; one of the two opens into the second side aisle. Ar the south is a sacristy and a double side aisle terminated by a sort of apse of little effect. The great vault is not drawn like those of Amiens and of Beauvais. The centre of the semicircle is placed on the last transverse arch, and the thrust of the diagonal arches is abutted by two half diagonal arches across the width of the last baw. Finally, if the choir of the cathedral of Troyes is of Champagne, built when that province was not yet reunited to France, it belongs as architecture to the royal domain. Its construction was certainly entrusted to one of those masters of works belonging to the school of Thomas of Cormont, architects who rebuilt in the 13 th century the high choir of the abbey church of S. Denis,[2] who erected the choir of the cathedral of Tours, whose plan we present here.(26). Compared to the plans that we have so far given, that of the cathedral of Tours is small;[3] but the construction is excellent. The triforium is opened like those of Troyes and of Amiens.

Note 2. p. 343. The high choir of the abbey church of S. Denis has the greatest analogy to that of the cathedral of Troyes.

Note 3. p. 343. The choir alone of that edefice dates from the 13 th century (first half). The nave and chapels belong to the succeeding centuries, the facade was only erected at the beginning of the 16 th century.

Yet Tours was a very important city in the 13 th century; but we no longer find in the people on the banks of the Loire

to a monument of the first order. The principal nave has not less than 47.6 ft. between axes; now when the plan of the choir of the cathedral of Troyes is compared with that of the choir of the cathedral of Rheims, for example, that in the c clear is of nearly the same dimension in width; what an enormous difference between the two edifices in volume of materials in the ground story. The architect of the cathedral of T Troyes established that vast monument on foundations composed only of bad sand and chalk rubbish; but with a perfect knowledge of the defects of his construction, he has sought to transfer his loads to the middle of the choir by giving the internal piers a relatively wide bearing and to the external b buttresses a volume less than in analogous edifices. Thus by not loading the exterior of his monument he hoped to avoid t the leaning outward, that must necessarily be produced by the weight of the buttresses increased by the thrust of the great vaults. It is unnecessary to state that he succeeded but imperfectly in the execution. In spite of their small weight the external buttresses lean under the oblique pressure of the f flying buttresses, and in the 14 th century it was necessary already to take measures to avert the injurious effects caused by the radical vice of the construction of the cathedral of Troyes. It is not alone in the foundations, that one notes the extreme parsimony with which the Eastern part of this edifice was erected; in elevation all resisting and thick members of the structure are built of small materials, irregular and of bad quality; the tracern, cornices and columns alone are of cut stone; the vaults are of chalk. The founder did not live to see the vast choir erected; his purpose was attained. The choir of the cathedral of Troyes is further very beautiful as a composition, in the interior one does not perceive that poor execution. The gallery or triforium is opened, as in the choir of the cathedral of Amiens, and all the windows are filled with beautiful stained glass. The internal sculpture is sober, but broad and beautiful; the chapels are of happy proportions. About the beginning of the 14 th century the nave was erected with double side aisles, a little later, i.e., toward the middle of the 14 th century, chapels were also added to this nave. The facade was only commenced in the 16 th century and remained unfinished. These structures of the 14 th and 15 th centu-

who allowed themselves to be carried away by the irresistible movement of that epoch, but could not collect the sums corresponding to the grandeur of the enterprises, whatever the good will of the faithful.

From this need of building vast churches with insufficient means resulted edifices, that could not present guarantees of durability. To be able to erect, at least partially, the structures without exhausting all disposable resources for the first works, men omitted foundations, or rather constructed them with such parsimony, that they offered no stability. When one has seen how were founded the cathedrals of Paris, Rheims, Chartres or Amiens, one can only admit that the masters of w works in the 12 th and 13 th centuries were not experts in the knowledge of the elements of construction. But some bishop demanded a vast cathedral, quickly built, that could rival those of the neighboring dioceses, and his resources were relatively small; he did not intend that under ground should be buried a great part of the sums collected with great difficulty, it was necessary to make a show; the master of works contented himself with casting into badly excavated trenches bad rubble, that was tamped, then he hastily erected a great edifice on that foundation of small resistance. Skilful even in his imprudence, he completed his work.

These last monuments are no less interesting to study, for they prove two things much better than those built with luxury; the first is that the new system of architecture adopted by the lay school lent itself to those imperfections in execution, and could if necessary do without precautions considered necessary; the second is that in such cases the masters of w works of the middle ages succeeded in erecting at moderate c cost vast edifices with a good appearance, by artifices of construction, that denote great subtilty and much skill. If these edifices fall today, if they have suffered frightful changes, they have no less endured for six centuries; the bishops that built them obtained results that they expected, they and their successors saw them standing.

Among the cathedrals constructed under such unfavorable conditions, it is necessary to cite in the first line the cathedral of Troyes. The choir and transept of the cathedral of Troyes, whose plan we present (2[illegible]), [illegible]

called taste, if it be so desored. Abuse is quickly reached, and abuse persists, because it is always made more seductive.

Note 1. p. 339. In the time when it was very seriously believed in France that Roman architecture was produced, men wore colossal wigs and shoes with high heels, canons covered by ribbons, aiglets and boldrics six inches wide, and we saw no evil in this; but men said to us very seriously, when we believed that we could derive something from the French architecture of the 13 th century, and when we induced young men to study it, to combat that opinion and desire, that we have no longer dressed as in the time of Philip August; do our clothes approach more nearly the Roman costume that that of Louis XIV?

From the middle of the 12 th century French architecture w was on the road to pass in brief time the limits of the possible; yet men stopped with boldness and did not reach extravagance. The architect of the choir of the cathedral of Beauvais, if that monument had been executed with care, fifty years after the beginning of pointed art, would have succeeded in producing all that art could produce; it is to be believed that the faults thet he committed in the execution arrested the enthusiasm of his colleagues; there was a reaction; from that moment imagination gave place to calculation, and the r religious structures that arose at the end of the 13 th century are the expression of an art arrived at its maturity, based on experience and reasoning, and that has nothing more to find.

But Before giving examples of these latter monuments, we c cannot omit speaking of certain cathedrals, that must be classed separately.

We first have to make known the edifices of the first order erected during a period of about sixty years, to satisfy the needs of the clergy and of the people in rich cities and by means of considerable resources. But if the enthusiasm that led the bishops to rebuild their cathedrals was the same over the entire area of the royal domain and the adjacent provinces, the resources were not nearly equal in all the dioceses. While Rheims, Chartres and Amiens erected their mother churches on vast plans, after having ensured durability by preliminary wo- works executed with a great luxury of precautions, other dioceses were surrounded by people less favored and less wealthy,

transition. The moment during which one can seize it is lost. The attempts in which is felt a superabundance of force and imagination, and an always logical formulary, frequently dry and cold. That is not only true of the arts of that epoch, but of the spirit of our country, which always falls through excess of imagination into excess of method and rule; that after being enthusiastic for the external forms of art is enthusiastic for an abstract principle; and to say all in a word, does not know how to keep itself within a just medium in all things.

It has been repeated to us many times, that we are Latins; by language, with which we agree; in mind we rather tend toware the Athenians. Like them, once at the foot of the ladder, we quickly reach the top, not to remain there but to descend. If we survey the history of the arts of all peoples (who had arts), we shall nowere find, unless this be at Athens and in the corner of the West that we occupy, this incessant need of making the scales of the balance sink sometimes at one side, sometimes at the other, without ever maintaining equilibrium.

What has always seemed to be feared most in France is immobility; to the need of movement has always been sacrificed a among us the true and the good, when by chance they have been attained. And to not leave questions of art, we have always c caused to succeed a period of invention, research, development of imagination, poetry, if you will, a period of reasoning; t to the wildness of caprice and of liberty an absolute rule. From the arcritecture so varied and full of invention of the beginning of the 13 th century, from that way so broad as to allow the mind to attain all the applications of art, men suddenly threw themselves into pure science, in a series of imperious deductions, that caused that art to pass from the hands of inspired artists into the hands of stonecutters. From the abuse of that principle sprung the architects of the Renaissance, who left full scope to their imagination; caprice reigned as absolute mistress; but soon depending on a Judaic (literal) interpretation of antique architecture, men desired to be more Roman than the Romans, circumscribed the art of architecture within the knowledge of the orders, subjected to imperative rules, that the ancients fully avoided recognizing.[1] Yet excesses in France are almost always covered by a varnish, a sort of covering that makes them supportable; this may be

transepts at Cologneare composed of four bays each, those of Amiens have but three. At Beauvais did the nave of the 13 th century have four side aisles? We cannot affirm this; but the plan of the apsidal chapels of Cologne appear calculated on those of Beauvais. Yet the architect of the cathedral of Cologne enlarged his side aisles and gave more strength to the external buttresses, he varied from the rule followed at Amiens and Beauvais for drawing the great vault of the apse; he knew how to avoid rashness, that caused the ruin of the choir of Beauvais; if his elevations and sections approach those of Amiens, they differ from those of Beauvais. Of these three c choirs erected at the same time, that of Cologne is certainly the latest; and the master of the works of this latter monument knew how to profit by the beautiful arrangements adopted at Beauvais and Amiens, by avoiding the defects into which his two predecessors had fallen. But we must say, that in spite of the perfection of the execution of the choir of the c cathedral of Cologne, in spite of the practical science displayed by the constructor of that edifice, in which there has appeared no serious movement, the conception of the choir of Beauvais appears superior to us. If the architect of the choir of Beauvais could have disposed of sufficiently abundant means, of materials of great volume; if he had not been compelled by the evident lack of financial resources to employ procedures too much inferior to the work projected; if he had not been restricted by the too limited site assigned him, he would have accomplished an incomparable work; for not in theory sins the choir of the cathedral of beauvais, but in execution, that is mediocre and poor. Do not forget that the cathedral of Beauvais was commenced at the moment, when already had slackened the religious and political movement, that caused the erection of the great cathedrals of the north.

Note 2. p. 237. Like all others, this plan is at the scale of 1:1000.

That French art of the 13 th century reached its development so rapidly, that already about the middle of the 13 th century it is felt, that it will stifle the imagination of the artist; it is frequently reduced to formulas containing more s science than inspiration; it tends to become commonplace. From experiments it falls into mathematical rigor almost without

A sacristy was built at D as at Amiens, and it was only at the beginning of the 16 th century, that men thought of completing this great monument. Yet this later construction could not extend beyond the transepts, as our plan indicates; the religious wars arrested forever their completion. [2]

Note 2. p. 336. In our plan the gray tint indicates the construction of the 16 th century, and the sketch is the project of the nave, which was never executed.

The cathedral of Amiens and that of Beauvais produced a third edifice whose execution successfully profited by the efforts attempted by the architects of those two monuments; we speak of the cathedral of Cologne. We have seen that the choir of the cathedral of Amiens must have been commenced from 1235 to 1240; that of Beauvais was founded in 1225; but we must c confess that in the middle parts of that edifice we see nothing, that can be earlier than 1240; yet in 1272 that choir being completed, since men were already occupied at that epoch in rebuilding the fallen vaults. In 1248 was commenced the construction of the choir of the cathedral of Cologne; [1] in 1322 this choir was dedicated. It has been pretended that the primitive projects of the cathedral of Cologne were rigorously followed in the continuation of that vas edifice; if that conjecture be not admissible in the execution of the architectural details, we believe it based on what concerns the general arrangement.

Note 1. p. 337. See the excellent Notice of M. Felix de Verneilh on the Cathedrale de Cologne in the Annals archeologiques of M. Didron; separately printed 1848. (Librarie archaeologique of M. V. Didron).

Here is the plan of that cathedral (24). [2] If we compare this plan with those of Amiens and Beauvais, we see between those three an incontestable degree of relationship; not only of a arrangement but of dimensions, nearly the same. At Amiens, if it be not the chapel of the Virgin that forms an exception, we see the choir composed of four parallel bays as at Cologne, in churches the side aisles are doubled before the apsidal chapels; they appear in the transepts. The most remarkable difference between the two edifices consists in the transepts and nave. The nave of the cathedral of Cologne possesses four side aisles; that of the cathedral of Amiens possesses only two. The

the width of the sanctuary will be inversely as the total width between the axes of the outer piers of the side aisles, f from the moment that the portion of the apsidal circle is divided into seven parts.

Note 1. p. 335. At the scale of 1:1000, like all other plans contained in this Article.

Note 2. p. 235. The central nave between axes of piers at Amiens is 47.8 ft.; at Beauvais is 51.2 ft.

In the apse of the cathedral of Chartres (Fig. 12), we have seen that the chapels are badly placed; the flying buttresses are not located on the prolongation of the line of the horizontal projection of the radiating arches of the sanctuary, th that one also finds there the results of hesitation and experiments. Nothing like this at Amiens and Beauvais; the position of the flying buttresses resting against the piers between t the radiating chapels is perfectly indicated by the prolongation of the radii directed to the centre of the apse. At Amiens and Beauvais is found no irregularity in the placing of the apsidal construction.

The architect of the cathedral of beauvais desired to surpass the work of the successors of Robert of Luzarches. Not on only (Fig. 22) did he attempt to give greater width to the s sanctuary of his church, but he had thought himself able to give also a greater opening to the arches parallel to the choir by erecting only three bays instead of four between the apse and the crossing. At the angle of the transepts he certainly had projected four towers, exclusive of the central tower, which was built. His apsidal chapels, smaller and lower t than those of Amiens, allowed a triforium to extend around b between their vaults and those of the side aisles and with windows above.[1] In elevation he gave greater height to his central construction and especially greater lightness. His e efforts were not crowned by success; the construction of the choir was scarcely completed with the four piers of the crossing and the central tower, when this construction, too light and whose execution was also neglected, partly fell. At the e end of the 13 th century, piers must be inserted between the piers of the three bays of the choir (Fig. 22) at A, B, C. (Art. Construction).

Note 1. p. 338. Art. Arc-Boutant, Fig. 61).

All this grand entirety of construction is admirably placed, regular and solid; the variations in the openings of the chapels average 1.2 to 1.6 inches at most. It is evident that t the horizontal projections of the arches of the vaults determined the arrangement of the plan. (Arts. Chapelle, Construction, Pilier, Travee, Voute, see for details of those parts of the cathedral of Amiens.

The cathedral of Amiens was not the only one constructed on this plan in that part of France from 1220 to 1260. At Beauvais in 1225 were laid the foundations of as vast a church; but the structure was begun in the latter city at the choir, according to the ordinary custom, the plan of this choir supports the opinion here given by us on the subject of drawing these monuments; that drawing of the sanctuary gave the relative w width of the side aisles and the central nave.

If we examine the plan of the cathedral of Beauvais (22),[1] we see that the width of the choir of the cathedral of Beauvais including side aisles is less than that of the choir of the cathedral of Amiens, yet the width of the sanctuary of Beauvais between axes of piers is much greater than that of Amiens.[2] Proceeding as we have indicated in Fig. 21 to trace the radiating parts of the apse, the centre being taken on the main axis about 8.2 ft. from the base line, as at Amiens, and the external circle to be divided in seven equal parts b being much smaller, it necessarily resulted that (these divisions further not being sides of regular polygons), that the radius passing through the first of these divisions and the centre cut the base line at a greater distance from the main axis. A Figure will illustrate what we wish to say; let (23) the base line be A B, C D be the main axis; O the centre for tracing two circular arcs A D B, G F E. If we divide each circular arc in seven equal parts, the radius H O drawn from the division point H of the larger circle being extended cuts the chord A B at the point K; while the radius drawn from the division point L of the smaller arc being prolonged cuts the s same chord at L. From which one must conclude, that if we follow the method adopted by the architects of the cathedrals of Amiens and of Beauvais for drawing an apse with side aisles and radiating chapels, that the centre of the apse being fixed at a constant distance from the base line on the main axis,

of Luzarches, the first architect. However that may be, this fact clearly indicates that the drawings were commenced at the apse; the arrangement of the apse determined the relative spacing of the piers of the nave and side aisles.

Note 2. p. 331. The architecture of the apsidal chapels of the cathedral of Amiens has the greatest resemblance to that of the S. Chapelle of Paris. There the same mouldings, tracery in the windows, system of construction. The arcade of the lower S. Chapelle reproduces that of the chapels around the choir of Amiens.

Note 3. p. 331. It is necessary to recall that the nave was entirely erected when the choir was scarcely commenced.

The radii G O, H O gave by their intersection of the little arc O E the centres of the other piers of the sanctuary. As for the chapels, those of the cathedral of Amiens present five sides of a regular octagon. Let us see how they were traced; the line N P being drawn as the axis of the chapel, the lines G G', F F' were drawn parallel to that axis. The base F G of the polygon being moved back to clear the pier, the line L M was drawn to bisect the right angle F L S. The angle M L S was bisected by the line L R. The intersection of this line L R with the axis N P is the centre T of the octagon. The lines T R, T M, T Z, T F' give the horizontal projection of four ar-arches of the vault. It is the same with the lines O C, O K F, O G, etc.

To draw the diagonal arches of the side aisles, let I be t the front of the pier separatiug the chapels, the line I I' is divided into two equal parts, and taking O J as radius a circle is described. The intersection of this circle with the axes of the chapels gives the centre of the keystones of the vaults. (Art. Voute).

Desiring to have a chapel on the axis deeper than the six others, the distance H W is taken on the prolongation of the line drawn from the point H parallel to the main axis, then starting from the point U, the procedure was as we have indicated as starting from the point L.

Fig. 21 presents the trace of the vaults and piers of the chapels, as well as the external buttresses, that are inscribed within a great circular area V Q of masonry rising about 3.3 ft. above the external soil.

But let us first examine the plan of this part of the edifice, which left the ground only a little before 1240, i.e., at the moment when was also commenced the S. Chapelle of the palace at Paris.[2] One recognizes a wise hand in the plan of the choir of Notre Dame of Amiens; there are no more experiments or uncertainties; hence our readers will not feel hardly toward us for showing them the mode of procedure employed by the third master of the works of Amiens, Renault of Cormont for tracing the ground story of the plan of the apse. Let A B be the base line of one half the apse (Fig. 21); the distances A C, C B are those between the axes of the row of piers; let the line A X be the longitudinal axis of the nave. On this axial line the draftsman commenced by placing the centre O at 3.2 ft. from the line A B; the two circles C E, B D were drawn w with the lines O C, O B as radii. The circular arc of which B D is half, was divided in seven equal parts, the radius F O prolonged was drawn; this radius intersects the arc C at the point of intersection by prolongation of the axis C C', and passing through the centre O meets the corresponding point at C. How did the draftsman obtain that result? Was it by trials or by a geometrical means? The sides B F G H do not belong to a polygon dividing the circle into equal parts. There is r reason to believe that the primitive trace of the apse determined the opening of the principal nave, and that Renault of Cormont in the arrangement of this apse only followed what his predecessors had sketched.[3] If the plan of the apse had not determined the distance A C, chance could not have made the intersection of the line F O, prolonged to the point corresponding to C with the axis C C' should fall on the arc C E. It is then probable that the width A B being given, the centre O was located on the main axis; that the great circular a arc B D was traced and divided in seven parts, and that the prolongation of the radius F O gave by its intersection with the line A B the breadth of the central nave. Then drawing t the arc C E, the perpendicular C C' must necessarily meet the radius F O at a point K of the circle, which became the centre of the second pier of the apse. It should not be forgotten further, that generally the construction of the cathedrals was commenced at the choir. Amiens forms an exception; but all t the drawings and the layout must have been prepared by Robert

One does not see at the top of the nave of Amiens that enormous mass of masonry with no other purpose than to load the piers so as to arrest the thrust of the vaults. Here all stability consists in the arrangement of the flying buttresses a and the thickness of the buttress A. Yet this nave with a height of 139.4 ft. beneath the crown and a width of 47.9 ft. between axes of piers is neither deformed nor inclined. The construction has suffered no sensible alteration; it is made to endure for centuries still, even if the means of removal of water have not kept it in good condition. At Amiens the walls have disappeared; behind the opening of the triforium at C is only a partition of stone, made still lighter by discharging arches; under the lower windows at D is only a thin wall lightened by an arcade; above the upper windows at E are only a cornice and a gutter, and light enters everywhere. The water from the great roof simply runs easily and by the shortest route to the channels of the upper flying buttresses. That received by the roofs of the side aisles is thrown by gargoyles to right and left of the buttresses.[1] It is difficult to see a more simple and economical construction in respect to its dimensions and the effect produced by it.

Note 1. p. 331. It is understood that we are speaking here of the nave of the cathedral of Amiens as it existed before the construction of the chapels of the 14 th century. that addition further allowed one to see the entire old arrangement, and in the interior of the transepts, the windows of the side aisles remained in place.

In the upper parts of the choir of the cathedral of Amiens, men desired to push the simple principle adopted for the nave to the last limits and exceeded the aim. When the construction of the upper work of the choir was resumed after an interruption of nearly twenty years, there had already been adopted the system of galleries in the second story with windows receiving external light, in the church of the abbey of S. Denis, in the cathedral of Troyes and even that of Beauvais. The triforium thus found itself participating with the great upper windows,and prolonged their openings and their rich decoration by stained glass down to the level of the window sills of the gallery. This system was too seductive not to be adopted by the architect of the high choir of Amiens.

of about 36,110 sq. ft., both solids and voids.[2] It is interesting to compare the two transverse sections of the cathedrals of Rheims and of Amiens. The nave of the cathedral of Amiens was rapidly erected at a single spurt about 10 years before that of Rheims, and presents a lighter and better understood construction. At Rheims not only in plan and the lower parts of the edifice are still found some traces of Romanesque traditions, but in the section of the nave is a luxury in the t thickness of the piers indicating a certain fear in the constructors. At Rheims (Fig. 14) the flying buttresses are placed too high; for example, one does not understand the function of the second arch. The triforium is little and mean; the transverse arches are to pointed for dimi ishing the thrust of the vaults, and consequently occupy too much height; their importance gives heaviness to the principal nave; it seems that y you are stifled by these vaults occupying an enormous area. Construction is the preoccupation. In the nave of Amiens, on the contrary, one breathes easily; scarcely does he think of piers or of construction; one does not see the monument, so to speak; it is a great reservoir of air and light.

Note 2. p. 328. The cathedral of Cologne covers an area of 95,798 sq. ft.; the cathedral of Rheims an area of 71,587 sq. ft.; the cathedral of Bourges one of 66,743 sq. ft.; the cathedral of Paris, 59,202 sq. ft.

Although the cathedral of Rheims is a pointed edifice, one feels there still the imprint of the antique monument; whether that influence be due to the genius od Robert of Coucy, or to the remains of Roman edifices scattered over the soil of Rheims, it is no less felt. The cathedral of Amiens in plan and structure is the pointed cathedral in particular. Examining the section (Fig. 20) one finds nowhere an excessive strength.[1] The piers of the side aisles are at least thinner by a third. The triforium B is tall and permits giving the roofs of the s side aisles a strong inclination. The flying buttresses are perfectly placed to abut the great vault. The load on the lower piers is lessened by hollowing out the buttresses attached to the upper piers; the transverse arches are less pointed th than those of Rheims.

Note 1. p. 330. Art. Architecture Religieuse, Fig. 35, an entire perspective of this section.

date from that epoch and later were placed on the jambs and piers of the 13 th century. The Virgin decorating the pier o cannot be earlier than 1250; the pier itself was then faced inside to receive a flat decoration, that did not exist originally.

The plan of the cathedral of Amiens does not indicate that the first masters of the work had the idea of erecting four towers at the angles of the transepts, as at Chartres, Laon and Rheims; thus we see today the cathedral of Amiens nearly as originally conceived, unless the two towers of the facade should have had a wider base and a much greater height. Yet one notes on this plan the stairways placed at the ends of t the double side aisles of the choir and preceding the chapels. These stairways are the last reflection of the towers placed at those points in Norman churches, and that as we have stated are still to be seen at Chartres. We find them again in the c cathedrals of Beauvais, Cologne, Narbonne, Limoges, which are all daughters of the cathedral of Amiens. On the north side r rise the old buildings of the bishop's palace, in communication with the cathedral by the great doorway of the western g gable wall and by a little doorway pierced beneath the sill of the window of the first bay of the side aisle. On the north side of the choir was placed a sacristy with treasury above. A cloister of the 14 th century with galleries entered from two chapels A and B, extended irregularly around the apse, f following the variations produced by old terraces. At D are placed dependances and a chapel, the old chapter hall dating likewise from the first half of the 14 th century. This cloister and the chapel were designated as the Macabre cloister a and chapel, by corruption from Maccabees. The glazed arcades of the cloister, or perhaps the walls, were probably decorated formerly by paintings representing the dance of death (macabre).[1]

Note 1. p. 328. Of these dependances, there remains today o only the chapel that serves as a great sacristy; it is decorated by a beautiful gallery of carved wood from the end of the 14 th century. A part of the cloister has been rebuilt since 1848, as well as the little building placed at D. The old remains were in ruins.

Here (20) is the transverse section of this immense church, the largest of French cathedrals, whose plan covers an area

these towers, have become angle buttresses. The most certain proof of this modification applied to the project of Robert of Luzarches is that the foundations exist under the entire perimeter of the towers, as they are indicated on the plan presented here. Of the primitive facade only remains the mullion a and the two jambs of the central portal, on which are sculptured the wise and foolish virgins, and the enclosure of the great rose window pierced beneath the principal vault. The t three porches, otherwise so remarkable, the pinnacles surmounting them, the open gallery and the gallery of the kings, date from about 1240, as well as in the lower story of the towers. As for the upper parts of these towers and the gallery between two, these are structures successively erected during the 14 th century. It was also during the 14 th century, that were closed the upper parts of the gables of the two transepts, wh which had probably remained unfinished, and that were were constructed chapels between the buttresses of the nave, an addition injurious to the preservation of the edifice, and that destroyed the unity and the grandeur of that admirable nave. The 14 th century also had executed the upper balustrades of the choir and the nave. The balustrades of the chapels and t the tracery of the two western and southern rose windows, the strengthening of the northern rose window were undertaken at the beginning of the 16 th century. The central spire in stone and carpentry placed on the four piers of the crossing about 1240 and under the episcopate of Arnault, was destroyed by lightning on July 15, 1527. It was feared for an instant, that this disaster would extend to the entire cathedral; happily the progress of the fire was quickly arrested, thanks to the devotion of the inhabitants of Amiens.

In 1529 was rebuilt the present spire in carpentry covered with lead by two Picard carpenters, Louis Cordon and Simon Ta Taneau. (Art. Fleche).

We have stated that Robert of Luzarches could see not only the foundations of his cathedral, but also some yards of the gable wall of the south transept rise above the ground. Indeed the portal pierced at the base of that gable, called portal of the gilded Virgin, presents architectural details older t than all those of the other parts of the edifice; yet this p portal was rebuilt about 1250: the tympanum and the voussoirs

the completion of the choir. It is certain that the triforium of the apse, and consequently all the upper work, was commenced only after this fire, for on the stones calcined in 1258 are set the first perfectly uninjured courses of this triforium. The successors of Arnoult, Gerard or Evrard de Couchy (for Coucy) and Aleaume de Neuilly, could only collect the funds necessary for continuing the work. At Amiens, as everywhere else, the people showed less enthusiasm for seeing completed the monument of the city; it took a very long time to gather the gifts necessary for the completion of the choir, and these gifts were not sufficiently abundant to permit the display in this structure of the grandeur and luxury found in the nave and the apsidal chapels. In 1269 that bishop had placed the stained glass in the high windows of the choir,[2] and his successor, William de Macon, in 1228 put the last touches to the vaults and the upper parts of the chevet. In constructing the nave from 1220 to 1228, it was desired first of all to close the nave, and no attention was paid to the facade, left incomplete. The central portal alone had been pierced at the base of the gable, and the upper rose window was opened. It was only in 1238, that a new impulse was given to the works by bishop Arnoult, that men thought of finishing the western facade. But probably already was ascertained the exhaustion of the r resources, so abundant in the reigh of Philip August, and the primitive projects were restricted. Examination of the edifice can leave no doubt in that respect.

Note 1. p. 325. (Old French text). Antiquitez de la ville d' Amiens. Adrian de la Morline. Chan. 1627.

Note 2. p. 325. The inscription stating this fact still exists on the upper stained glass window situated in the axis of the choir.

By casting the eyes on the plan (Fig. 19) we see a line E F drawn parallel to the gable wall of the portal; this is the limit of the removal of the old facade, projecting from which has been placed the existing portal. From that modification of the primitive project, it results that the two towers G H are rectangular, instead of being built on a square plan like all towers of cathedrals of that epoch, with less depth than width; these are only half towers in their entire height, and the two buttresses, that should be found at the side in the middle of

Men must limit themselves to rebuilding the carpentry, the upper galleries, the gables, to repairing the towers of the portals, and to removing the four towers of the transepts down to the level of the base of the great roof. In that state we find this monument today, so splendid still in spite of the mutilations it has suffered.

Note 1. p. 323. Jean and Remi Legoix.

Note 2. p. 323. Anquetil.

The cathedral of Amiens was devastated by fire and Norman invasions in 850, 1019 and 1107, and it was entirely destroyed by a fire in 1218. In 1220 Evrard de Fouilloy, 45 th bishop of Amiens, caused the laying of the foundations of the present cathedral. The master of the works was Robert of Luzarches. The Picard bishop sought his architect in Ile-de-France. The new structure was commenced at the nave; probably the remains of the old choir were temporarily retained in order not to interrupt the worship. In 123 bishop Evrard died; the foundations were finished under the nave, and probably the south transept gable wall had risen some yards above ground. Under the episcopate of the successor of bishop Evrard, Geoffrey d' Eu, we see the works already entrusted to a second archetect, Thomas of Cormont. Robert of Luzarches could only leave the p plans of the edifice he had founded. The second master of the work erected the structure of the nave up to the springing of the great vaults; we then come to the year 1228. His son, Renault of Cormont, continued the work and passes for having c completed it in 1288, which is scarcely admissible, if we observe the profound differences of style, that exist between the ground story and the upper parts of the choir. In 1237 bishop Geoffrey died; his successor Arnoult completed the vaults of the nave and caused the erection on the central part of the crossing, of a stone tower surmounted by a spire of wood and lead. It was also probably this bishop, who caused the erection of the chapels of the choir.[1] In 1240 bishop Arnoult had pushed the works with such activity, that the funds were exhausted; it was necessary to suspend the construction and collect new sums. In 1258 a fire consumed the carpentry of the apsidal chapels, still perfectly visible today are the traces of this disaster above the vaults of these chapels. Th This misfortune must also have contributed to the delay in t

Rheims is one of the most splendid conceptions of the 13 th century; it further has the advantage of being the only one. Notre Dame of Paris is still a facade of the epoch of transition. It is the same at Laon. We cannot regard these portals as belonging to the pure pointed style. Amiens has only a truncated and unfinished facade on which are superposed the different epochs.

Chartres is only a collection of fragments. Bourges and Rouen are mixtures of the styles of three or four centuries. T The facades of Bayeux, Coutances, Soissons, Noyon, Sens and Seez remained unfinished, have been denatured, or present a mass of constructions without entirety and successively erected without a decided project. The principal facade of Notre Dame of Rheims, in spite of that excess of richness, then has for us the advantage of giving us a frank conception in the pointed style, and from that point of view it merits the entire attention of architects. Its iconography is complete, and that in fact alone is of great importance. But we shall return to that part of the decoration of cathedrals.

To give an idea of what should be the cathedral of the 13 th century, complete and finished as it had been conceived, we give here (18) a perspective of an edifice of that epoch executed after the type adopted at Rheims. Neglecting the details, to which we attach no importance here, it may be admitted that the monument projected by Robert of Coucy must present this entirety, excepting that the western spires were never completed, and the central and transept spires were of w wood and lead. On July 24, 1481, plumbers whose names have r remained to us,[1] set fire to the roof by negligence. The fire consumed all the carpentry. There was around the edifice such a deluge of lead, that one could not approach to bring aid. The devotion of the citizens could not master the scourge, a and it was a real disaster, not only in the province but in all France. Louis XI received very badly the news of this misfortune, brought to him at Plessis-les-Tours; there was a question of replacing the chapter by monks.[2] Whatever sacrifices were imposed on the chapter and the archbishop, and the royal gifts that were considerable, none could think of restoring the monument to its condition before the fire. The sap that flowed in this great body in the 13 th century was exhausted.

was only in 1240 that were continued the upper parts of the c choir, that were commenced the first bays of the nave and the facade. That was only completed about the beginning of the 14 th century, except the two spires of the two western towers; men still worked on it during the 15 th century, but followed the arrangement and details of the 13 th and 14 th centuries. A cloister arose at the north of the nave and the transept; and it was probably to give entrance to this cloister, that was opened the doorway in the bay of the right of the north gable wall, a doorway just mentioned. Two other public doorways were opened in the two other bays of the gable wall about the middle of the 13 th century, and richly decorated by voussoirs, reliefs and statues.[1] Two towers rise on the western facade; four towers surmount the four angles of the transepts, and a little central tower stands at the centre of the edifice on the four piers of the crossing. A spire of lead covered the kingpost of the hip roof over the sanctuary. The gable wall of the south transept next the side of the archbishop's palace was never pierced by great portals. One came from the palace of the archbishop to the choir by secondary doorways pierced in the substructure of this gable wall. ((See plan). During the 14 th and 15 th centuries small chapels were built at the north side between the buttresses of the n nave and in the interval left by the cloister; but these little chapels, that do not extent above the sills of the windows, nowise interfere with the internal arrangement of the nave; they only open into the side aisle by little doorways.

Note 1. p. 322. The central portal alone is open today.

If the projects of Robert of Coucy were modified, this was especially in the construction of the western facade, which presents all the characteristics of the richest architecture of the second half of the 13 th century. As for the decoration, it is still connected with the lateral facades by those admirable crownings of the buttresses in which are placed colossal statues. But the multiplicity of the details injures t the entirety; this facade has not the grandeur of the lateral facades, however beautiful it may be. The architecture of the principal portal encrouches on the base of the intermediate buttresses, which vexes the eye; plain and quiet parts are a absent. Yet as it is, the western facade of the cathedral of

of the transition, while the windows of the chapels of the o choir are already provided with tracery, whose forms, particular arrangement and jointing are identically similar to the tracery of the side aisles of the nave of the cathedral of Amiens, which dates from about 1230. Robert of Coucy could properly amend certain details of his project, at the same time when he adopted the polygonal exterior for these chapels above the circular form of their substructure. However that may be, the master of the work in dying or abandoning the construction to younger architects, perhaps after an interruption of several years, left projects that his successors approximated as nearly as possible, in spite of the reductions we have mentioned. It is this that gives this edifice such a remarkable character of unity, although a century may have been required to carry the work to the high vaults. At Rheims more t than elsewhere was respected the conception of the first master of the works. Thus when one wishes to form an idea of what must be a cathedral conceived by the architect at the beginning of the 13 th century, the most beautiful epoch of pointed art, it is necessary to go to Rheims. And yet this great monument has suffered important modifications; and as we see it today, how far it is from the projects of Robert of Coucy, a and even from what it was before the fire at the end of the 15 th century.

Note 1. p. 321. It is understood that for the north gable wall, we do not speak of the two doorways pierced about the middle of the 13 th century.

The plan of the cathedral of Rheims is simple (Fig. 13); the radiating chapels of the choir are wide and deep; the nave is long and without chapels, The sections and elevations of the lateral parts of the edifice correspond to the simplicity of the plan, the buttresses and flying buttresses are admirable in conception and grandeur; the piers are thick, and the upper windows are deeply enclosed. This edifice has all the f force of the cathedral of Chartres without its heaviness; finally it combines the true conditions of beauty in the arts, power and grace; it is further constructed of beautiful materials wisely jointed, and one finds in all its parts a care and research very rare at that epoch, when men built with great rapidity and frequently with insufficient resources. It

between the buttresses; this doorway with painted sculptures edidently dates from the primary construction commenced by Robert of Coucy, and reliefs could also be attributed to the school of sculptors of the end of the 12 th century. The lower parts of the gable wall of the south transept, that were not modified by opening the portals, affect a severity of style in nothing inferior to the lower structure of the facade of Notre Dame of Paris. Finally, everything in the ground story of the cathedral of Rheims, from the choir for half the nave denotes the work of the artist belonging to the lay school of architects originating at the end of the 12 th century. Above the pointed style has taken its entire development, but the transition between the architectural characters of both is skilfully managed. We do not know in what year Robert of Coucy ceased to work on the cathedral; yet in building he probably modified some details of his original project. That architect was not in his first attempt, when he began the work in 1212, and perhaps he was already at a quite advanced age; yet (and the Notes of Vilars of Honnecourt are there to prove it) he sought without ceasing, like all his contemporaries, improvements in the art left by the 12 th century; he could not ignore what was attempted around him; thus he was brought to terminate the chapels of the choir by polygonal exteriors, when commenced on a circular plan like those of the cathedral of Noyon. The ornaments of the cornice of those chapels, the steps mentioned by Vilars, the style of the angels surmounting the little buttresses, can leave no doubt that they were composed by Robert of Coucy from 1220 to 1230. Several years were required to lay the foundations of that edifice commenced according to such a strong project, the more so as the ground on which rests the cathedral of Rheims is not homogeneous, and becomes good only at a depth of several yards below the pavement. (13 to 23 ft., according to excavations made around it). It is then not surprising that these enormous structures, whatever the activity devoted to their execution, were not carried above the lower vaults in 1230, i.e., 18 years after their commencement. At first sight, the ground story of the gable walls of the two transepts [1] appear older than the chapels of the choir; the low windows are without tracery and are enclosed by mouldings and ornaments, that recall the architecture

modification of the projects. The wash of the moulding crowning the cornice passing at the level of the side aisles before the buttresses of the transepts and choir has little horizontal rests spaced 1.3 to 16 ft, that form battlements, and that Vilars of Honnecourt, contemporary and friend of Robert of C Coucy calls in his curious Notes steps reserved on the wash of the mouldings to allow the workmen to pass around the buttresses on the outside.(Fig. 16). That is very ingenious and well intended, since the wash of the mouldings without that aid would not allow passage before the buttress at all heights. Now these steps mentioned by Vilars exist only on the mouldings crowning the ground story. Yet Robert of Coucy, if he had continued the work, would have reserved for a stronger reason similar passages in the upper parts of the edifice; but the surfaces rising above these mouldings with steps, instead of being flush with the upper bed of the moulding, as indicated in Fig. 17, are below it as shown in Fig. 17 bis. Thus then the step became useless, since behind them remained a horizontal part allowing passage; then if Robert of Coucy had desired his battlements to recede so abruptlyin the second story, he would not have reserved steps on the crown moulding; aud since he did reserve them, this was because he inteuded to give to his great parts the support of a projection, and consequently a strength greater than that left after the abandoning of the first projects. There is thus reason to believe t that Robert of Coucy erected the cathedral of Rheims as far as the height of the cornices of the chapels of the choir and side aisles, except the four first bays of the nave, which he did not commence; that after him the construction was continued with changes from the primitive projects to reduce expenses; that this necessity of completing the edifice at less c cost was the result of a decrease in gifts made by the people. The ornamentation of the lower parts of the choir and transepts of the cathedral of Rheims, up to and including the cornice of the radiating chapels, still bears the stamp of the sculpture of the end of the 12 th century; while immediately above the level of the cornice of these chapels appears an ornamentation with all the characters of that of the middle of the 13 th century. In the right bay of the gable of the north transept is pierced a doorway now opening into the little sacristy

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His doubts were too well founded. Yet the project of Robert was rapidly executed up to the height of the vaults of the s side aisles, from the choir to about half the nave.

We present (13) the plan of the cathedral of Rheims.

If we compare this plan with those of Notre Dame of Paris, of the cathedrals of Bourges, Noyon, Laon and Chartres, we s shall be struck by the relative thickness of the construction forming the exterior of the edifice. That is because Robert of Coucy belonged to the school of strong constructors, that this school was trained in a country in which stone is abundant; and still more that Robert had conceived an edifice attaining colossal dimensions. The structure had scarcely reached the height of the low naves, when it was necessary to renounce the execution in all their entirety, of the projects of Robert, and that it was essential to make certain sacrifices, probably because of the recognized insufficiency of future resources. The plan of the second story of the cathedral of Rheims i far from corresponding to the strength of the substructure. Yet it is certain that the primitive projects were f followed as much as possible while diminishing the volume of the supports; and it requires particular attention and especially the knowledge of the structures of that epoch, to recognize these changes made in the plans of Robert of Coucy. But we shall endeavor to make them apparent to everyone, for this fact does not fail to have great importance for the history of our cathedrals, the more that it is found everywhere at that epoch.

First (Fig. 14) here is a transverse section of the nave of the cathedral of Rheims. It is easy to recognize that the buttresses at the height of the side aisle have a strength and projection not produced by the lightness of the upper part receiving the flying buttress; one will be more struck by the difference in strength of the upper and lower parts of these buttresses in examiniug the external perspective of the buttresses of the nave.(Fig. 15). In the construction of the two gables of the transepts, the difference between the ground s story and the upper stories is still more marked. Robert of Coucy had probably projected at that point towers, whose height it was necessary to reduce for reasons of economy. Examination of the details supports the conjecture of a modificat-

epoch; and from the top of the hill serving it as base, its strong outline which only possesses two out of nine spires, is a cause of astonishment and of admiration for strangers crossing the Beauce.

We no longer find at Chartres the upper vaulted gallery; a simple triforium is decorated by an arcade and leaves an internal passage entirely around the cathedral behind the shed roofs of the side aisles. This church is the most substantially constructed of all cathedrals of France,[1] and presents in its transverse section nothing peculiar to it, if this be not the arrangement of the flying buttresses.(Art. Arcs-Boutants, Fig. 54).

Note 1. p. 315. The cathedral of Chartres is built of stone from Berchere; it is a hard limestone of coarse appearance, but solid under every test. The blocks employed are of extraordinary size. We shall have occasion to return to these details. (Arcs-Boutant, Base, Construction, Porche, Pilier, Soubassement).

To preserve a logical order in this Article, we must for t the present leave aside certain details to which we shall have to return, and pursue our summary examination of the cathedrals erected at the beginning of the 13 th century. So far we have presented plans in which are found indecision, experiments, the impression of former traditions. Even at Chartres t the foundations of the church of Fulbert and the preservation of the old towers did not leave to the architects entire liberty.

In 1211 the old cathedral of Rheims built by Ebon, and which dated from the 9 th century, was destroyed by fire from base to roof. That church was wainscoted and probably took the form of the basilica. After the following year in 1212 Alberic de Humbert, who occupied the throne of the archbishop of Rheims, set the first stone of the existing cathedral; the work was entrusted to a man whose name has remained to us, Robert of Coucy. If the monument was in Champagne, the architect was f from a neighboring city of the royal domain; that fact should not be forgotten. The plan conceived by Robert of Coucy was vast and established on soled bases; that architect doubted the power of erecting what he had projected, the extent of t the resources and perhaps the constancy of the people of Rheims.

choir; this is probably to give it two more bays, that the old porch was removed and the portals were advanced to the plane of the external wall of the towers. Desiring to retain in building the choir crypt serving it as foundation, and the two beautiful western towers, it was impossible to give the church a greater length.

At the four angles of the transepts four towers B were commenced (Fig. 12;, presenting the plan of the second story of half the choir and transepts of the cathedral of Chartres); they remained incomplete, as well as the central tower, that probably must have risen on the four great piers C of the crossing. Two other towers A were erected over the two last bays of the second side aisle of the choir preceding the apsidal chapels; these towers likewise remained unfinished at the height of the upper cornice of the choir. Thus nine towers accompanied the great cathedral of the province of Chartres. The towers at A before the semicircle belonged to the Norman conarrangement; many churches of that province possessed towers thus erected over the side aisles beyond the transepts. This monument, if entirely completed with its nine spires complete in height even to the central spire, would have had a prodigious effect.

A single chapel was erected at the south between the buttresses of the nave in 1413. At the beginning of the 16 th century, the unfinished north spire of the portal remained, and there was erected the graceful enclosure of the choir, that we still see today, and which alone has resisted in part the mutilations, that the canons caused the sanctuary to suffer during the last century. All the stained glass of that edifice is of the greatest magnificence and dates from the 13 th century, except that of the three windows of the western portal, that was replaced with the openings and comes from the church of the 12 th century.

Willian le Breton was right in 1220, when he said that the cathedral of Chartres had nothing more to fear from fire. In 1386 a terrible fire consumed the entire upper carpentry and the beautiful belfry of the old tower.(Art. Beffroi). The old cathedral could resist that test; it is still standing as the constructors of the 13 th century have left it to us; it remains as a witness of the energetic power of the arts of that

is the principal object, more than at Paris, Bourges, Soissons, and particularly at Laon; for it was built the church. It is necessary to assume that the church of Fulbert was already v very vast, for the existing crypts dating from his episcopate occupy the entire area of the first side aisle; the central nave and the choir being level, the 13 th century thus added to the Romanesqae edifice in area, only the second side aisle of the choir, the apsidal chapels and the ends of the two transepts.

We see reproduced in Notre Dame of Chartres a fact analogous to those mentioned in the construction of the cathedrals of P Paris and of Bourges. Not only did architects of the 13 th c century retain the two western spires of the church of the 1 12 th century, but they desired not to lose the three beautiful portals, that opened into the nave and were formerly placed back of the porch at A. (See plan). There is still seen between the two towers traces of the structure of this porch and the charm of the front wall. The three portals with their beautiful statues, tympanums, voussoirs and wendows over them, replaced on the line of the two towers, were crowned by a r rose window opening beneath the vault of the central nave. Th The construction of the cathedral of Chartres was conducted with inconceivable rapidity. The earnestness of the people, nobles and sovereigns to bring the work to an end was nowhere more active. Thus this edifice presents great homogeneity of style; it must have been entirely finished about 1240. [1] From 1240 to 1250 were added the porches at the two e trances of the transepts; the sacristy was built at the north near the choir at the end of the 13 th century, and about the middle of the 14 th century was erected near the apse the chapel of S. Piat in two stories. Also during the second half of the 13 th century was placed the admirable rood screen, that closed the entrance of the choir a century since.[2]

Note 1. p. 313. Notre Dame of Chartres was dedicated only on Oct. 17, 1260.

Note 2. p. 313. Fragments of that rood screen have been discovered in great number beneath the pavement; they are of the greatest beauty, and are now deposited in the crypt and under the chapel of S. Piat. (Art. Jube).

At Notre Dame of Chartres the nave is short compared to the

are as many attempts under the influence of differing programmes. men erected new cathedrals larger than the Romanesque churches to follow the movement so pronounced during the reigns of Louis the Young and Philip Augustbut the type had not risen from the ground. We shall see it definitely born and arrive at its perfection in a few years.

Note 1. p. 311. We include the cathedral of Bourges in that period, because there is reason to assume in examining its p plan, that the architects of the 13 th century that built it had erected an earlier project, perhaps that conceived in the second half of the 12 th century.

After a fire that destroyed the cathedral of Chartres from ground to ridge in 1020, bishop Fulbert desired to rebuild his church. The work was continued by his successors at long intervals. In 1145 the two spires of the western facade, that we still see today, were under full construction. In 1194 a new fire ruined the scarcely finished edefice of Fulbert. The lower portion of the western facade, the old completed spire and the base of the new one under construction, escaped destruction. On the still smoking ruins of the cathedral, Melior, cardinal legate of Pope Celestin III, assembled the clergy and people of Chartres, and as a result of his exhortations, all set to work to rebuild on a new plan the old church of Notre Dame.[2] Bishop Regnault de Moucon and the canons gave the total of their revenues and their prebends for three years.

(Old French poem).

Note 2. Descrip. de la cath. de Chartres, by abbe Bulteau. 1850.

Philip August, Louis VIII and S. Louis contributed by their gifts to the erection of the vast church.[3]

Note 3. p. p. 311. Poeme des Miracles. p. 27.(Jehan le Marchant.).

Already in 1220 William le Breton says on its vaults,"that one can compare to the shell of a tortoise,"says he, and which are solid enough to defy fires later.

Fig. 11 gives the plan of the cathedral of Chartres. Here the religious influence entirely appears. Three great chapels at the apse, four others less pronounced, double side aisles of great width and extending around the choir with vast transepts. There the worship may display all its pomp; the choir

The cathedral of Laon retains something of its democratic origin; it does not have the religious appearance of the churches of Chartres, Amiens or Rheims. Afar it appears a castle rather than a church, its nave is low, compared with the pointed naves of even that of Noyon; its external effect is somewhat brutal and wild; and even those colossal sculptures of animals, oxen and horses, that seem to guard the summits of the towers of the facade (Art. Animaux), all unite in producing an impression of fear rather than a religious feeling, w when one ascends the plateau on which it rises. On seeing Notre Dame of Laon, one does not feel the impression of an advanced and regulated civilization as at Paris or Amiens; there all is rude and bold; it is the monument of an enterprising people, energetic and full of manly greatness. There are some men that one finds again at Coucy-le-Chateau, a race of giants.

We shall not leave that part of France without speaking of the cathedral of Soissons. That adifice was certainly conceived on a plan, whose arrangement recalls that of the cathedral of Noyon (Fig. 12). As at Noyon, the south transept of the c cathedral of Soissons is rounded, dating from the end of the 12 th century, and is flanked at the east by a vast circular chapel in two stories, like those of the transepts at Laon. At Soissons this circular transept has a side aisle with vaulted gallery above and a triforium in the height of the roof of the gallery. (Art. Architecture Religieuse; Figs. 30, 31). T The upper story of the circular chapel served as a treasury b before the revolution; was that its primitive purpose? This we cannot state today, having no data on the utility of these chapels in two stories, which we find again at S. Remy of Rheims and in the great church of S. Germer.

Whether the cathedral of Soissons was entirely erected during the last years of the 12 th century or only commenced, the choir and nave were certainly built during the first years of the 13 th century. The choir is accompanied by five circular and eight rectangular chapels. That is already a modification of the plan of the cathedrals of that epoch. The north transept was only terminated later, as well as the facade.

Untel now we see prevailing in these edifices erected from the middle of the 12 th century until the beginning of the 13 th [1] a sort of uncertainty; the plans of the French cathedrals

not earlier than 1230.

Not alone this rectangular apse strikes us in the plan of t the cathedral of Laon (Fig. 9), it is also the arrangement of the side aisles with upper vaulted galleries, as at Notre Dame of Paris, as at Noyon and originally at the cathedral of Meaux; it is the place occupied by the circular chapels of the transepts, chapels en two stories; the presence of four towers at the foun angles of the two transepts and ofa square tower on the piers of the crossing; it is that great and beautiful chapter hall, that opens on the south of the first bays of the nave; then the two halls, treasuries and sacristies, that adjoin the choir, and are reserved between the side aisles and the circular chapels. One sees in all that a plan conceived and executed at one spurt, an arrangement very frankly required by a decided programme. As for the style of architecture adopted in the cathedral of Laon, it approaches that of the parts of Notre Dame of Paris, which date from the beginning of the 13 th century; yet it is more heavy and stumpy; it must be stated also, that the materials employed are coarser.

At the end of the 13 th century, this beautiful plan was d disfigured by the addition of chapels erected between the projections of the buttresses and the nave. A hall was erected in the middle of the yard of the cloister. Also during the c course of the 13 th century the original arrangement of the porch was modified. The seven towers were surmounted by spires, now destroyed. (Art. Clocher).

In spite of its importance, the cathedral of Laon was erected with haste, such that in some points and particularly on the facade, the constructors disdained to take the precautions usually taken, when edifices of these dimensions are built; the foundations were neglected or placed in the midst of former substructures; time was not left for the substructures of the towers to settle before completing their tops. There resulted irregular settlements and cracks that threatened the st- stability of the facade. [1]

Note 1. p. 309. This part of the cathedral of Laon is today under full restoration under the direction of M. Boeswillwald, architect of historic monuments. The cathedral of Laon has n not been an episcopal seat since the revolution; it belongs to the see of Soissons.

sooner or later, and believed it better to obey the wishes of the citizens, than to shed blood to postpone for some days an inevitable revolution. By his own impulse the bishop of Noyon convoked in assembly all the clerics, knights, merchants aud artizans. He presented to them a charter, that made the body of the citizens a perpetual association under magistrates called sworn men (jurates),like those of Cambray."

Note 1. p. 307. Lettres sur l'hist. de France, by Aug. Thierry. (Letter 15).

M. Vitet then is correct in stating,[1] "that when Beaudoin II undertook the rebuilding of his cathedral, there existed at Noyon a long established commune, consecrated by peaceful enjoyment, but in some sort under the tutelage of the bishop."

Note 1. p. 308. Monog. de la cath. de Noyon.

Thus the cathedral of Noyon presents the plan of a religious edifice; apse with chapels, transepts with ronnded ends. There the clergy remained the director of the works, there was no need of making any concession; when it commenced the work, it had no recourse to the intervention of the royal power, any more than the commune. There entered into the cathedral of Noyon fewer lay elements than into the cathedral of Senlis, for example, built at the same time, where the pointed arch exclusively dominates. But the cathedral of Noyon is nearly 50 years earcier than that of Laon, one will object that it is not surprising for its plan to approach more nearly the clerical traditions; that is true. Yet we have seen the plan of the cathedral of Bourges, contemporary with that of Laon, where the clerical tradition is still retained; we shall soon see the plan of the cathedral of Chartres, where more than e even at Bourges are observed the religious principles of Romanesque architecture. On the contrary, Laon possesses a plan with a divided character; it was necessary to give a large p part to lay ideas. Perhaps one would again pretend, that the bishops of Laon having had frequent relations with England, t their cathedral took the rectangular arrangement of the plan of the apse from the monuments of that country, this observation cannot be accepted, for the reason that the rectangular English apses are later than that of Laon, the choir of the cathedral of Canterbury, that dates from the 12 th century, is circular; the rectangular apses of Ely and of Lincoln are

worship, but even for secular assemblies. We do not conceal how strange are these conjectures to persons, who have not lived in the society of the middle ages, so to speak, who b believe that society was subject to a purely feudal and theocratic rule; but when one penetrates into that civilization found in the 12 th and developed in the 13 th centuries, he sees at each step originate a need of liberty so pronounced beside monstrous privileges, such an active tendency toward national unity, that he is not surprised to find the high clergy disposed to aid this movement, and seeking to direct it so as not to be carried out of bounds. The bishops loved better to open vast edifices to the multitude, safe in sometimes permitting it saturnalias like those just examined, rather t than to shut themselves within the sanctuary, letting popular ideas boil outside. Under the vaults of the great cathedral the assemblages of citizens, although secular, were necessarily impressed by a religious character. When people thus accustomed themselves to regard the cathedral as the centre of all p public manifestations. The bishops and chapters were right; t they understood their epoch; they knew how to civilize minds still rude, easily excited, united by a profound feeling of union and independence, it was essential for the religious monument in particular to be the pivot of every public act.

Laon is a turbulent city, that for a century was in open c conflict with its lord, the bishop. After these troubles and disputes, the royal power commenced to inspire by its conduct confidence in its strength, succeeding in establishing peace; but men remembered on both sides those struggles in which nobles and peaple had suffered equally; it was necessary to make reciprocal concessions for the peace to be permanent, the cathedral was affected by that just compromise; its purpose was religious, but its plan retainef a solid character.

At Noyon other precedents produced different results.

"In the year 1098," says M. A. Thierry,[1] "Baudri de Sarchainville, archdeacon of the cathedral church of Noyon, was promoted by the choice of the clergy of that chuhch to the episcopal dignity. He did not share the violent aversion, that p persons of his order generally had against the institution of the communes. He saw in that institution a sort of necessity to which by freewill or force, it would be necessary to yield

evening they were feasted at the cost of the chapter.[2] Eight days later came the festival of the fools. The eve of Epiphany, the chaplains and choristers gathered to elect a pope, called patriarch of fools. Those absent from the election paid a fine. The patriarch was offered bread aud wine on behalf of the chapter, that gave each one besdes eight Paris livres for the feast. The entire troop was covered by eccentric ornaments, and it had the cathedral entirely at its disposal for the two following days. After several processions through the city t the festival ended with the great procession of the "labardiaux." These farces were abolished in 1560; but their memory was preserved by the custom, that continued until the last (18 th) century, of distributing at the mass of the Epiphany crowns of green leaves to those present.[3] In the 15 th century numerous mystery plays were represented in the cathedral of Laon, and the canons themselves did not disdain to appear there as actors.[4] In 1462 at the festival of Pentecost was performed the Passion of our Lord Jesus Christ, divided into five days. On Aug. 26, 1476, was represented a mystery play entitled, "the plays of the life of lord S. Denis." To facilitate the representation, mass was said at 8 o'clock and vespers chanted at noon.[5]

Note 1. p. 306. Essai. Hist. et archaeol. sur l'egl. cath. de N. D. de Laon, by J. Marion. 1843.

Note 2. p. 306. Dom Bugnatre.

Note 3. p. 306. Dom Bugnotre.

Note 4. p. 306. Regist. capit.

Note 5. p. 306. Regist. capit.

If the chapter and the bishops of Laon believed it necessary to make such concessions to the citizens, one cannot admit that this tolerance influenced the primitive arrangement of t the plan of the cathedral.

After the struggles and the tragic scenes that stained with blood the establishment of the commune of Laon, when by intervention of the royal power, that commune was definitely constituted, it is probable that with a common accord the chapter, bishop and citizens erected this edifice both religious and civil. By concessions of this kind the clergy could bring the citizens of a rich city to sacrifice the money necessary for the construction of a monument, that must not only serve for

L. Vitet, and the atlas of plates by M. D. Romee. 1845.

If there be a cathedral that exactly fulfils the conditions imposed in reconstructions of those great edifices at the end of the 12 and beginning of the 13 th centuries, it is that of Laon. It has been desired to see in the existing cathedral of Laon , that was rebuilt or repaired after the disasters in 1112, that marked the establishment of the commune. That is not admissible; the monument is there, which better than all texts gives the precise data of its reconstruction, and we n need not return to this after the observations on the cathedral of Laon, that M. Vitet has given in his Monographie de Notre Dame de Laon.

The cathedral of Laon (Fig. 9) presents in plan a great nave with side aisles, intersected nearly at its middle by transepts; the apse terminates in square form. Two chapels only are placed at the East of the two ends of the arms of the cross. The city of Laon during the 12 th and 13 th centuries was a rich, populous and turbulent city, it established by arms one of the first communes, and after much tumult and violence obtained from Philip August a peace or confirmation of the commune for an annual rental of 200 Paris livres. [1] It was probably a little time after the grant of the peace, that the citizens of Laon as quiet possessors of their fhancheses, aided the bishops of that diocese to erect the admirable edifice, t that we still see today.

Note 1. p. 305. Lett. sur l'hist. de France. Aug. Thierry. (Letter 18).

Of all urban peoples that established communes in the North of France, that of Laon was one of the most energetic, and whose tendencies were more particularly democratic. Was the plan given to their cathedral a sort of concession to that rpirit? We dare not affirm so; it is no less certain that this plan is that of all our great cathedrals, that by their arrangement best lend themselves to popular assemblies. In this nave, that retained the character of an immense hall, during more than three centuries occurred the most singular scenes at certain seasons of the year. We have already stated that"there was c celebrated there on Dec. 28 the festival of the innocents, [1] when boys of the choir wore copes, occupied the high stalls and sang the offices with every sort of buffoonery; in the

inscribed in the plan of the nave, the vaults are constructed according to the mode adopted in the 13 th century, i.e., that each pier, large or small, supports transverse and diagonal arches (Fig. 7); only the transverse arches of the great piers are thicker than those placed on the intermediate piers. There is reason to believe, that the vaults of the nave were in part rebuilt after the fire of 1238, the great tranrverse arches alone being restored; instead of rebuilding these vaults as they had existed, i.e., with diagonal arches resting only on the great piers, they followed then the method adopted everywhere. If we examine the profiles of these pointed and diagonal arches resting on the intermediate piers, we se that indeed these profiles do not appear to belong to the end of the 12 th century. The vaults of the choir and apsidal chapels alone are certainly of the primitive construction; their ribs are ornamented by pearls, very delicate rosettes, like the arches of the vaults of the front part of the church of S. Denis. However that may be, the cathedral of Noyon was entirely completed at the end of the 12 th century, and except some additions and restorations made after the fire of 1293 and after the w wars of the 16 th century, it has come to us in nearly its p primary form.

At Noyon as at the cathedral of Paris, and in the church of S. Denis built by Suger, the side aisles are surmounted by a vaulted gallery in the second story.[1] Examining the section of the choir, one sees that the arcade above the gallery of the second story is only a false triforium, a simple decoration attached to the wall extending the height of the shed roof covering the vaults of the second story. That arcade is detached in the nave; it is an actual triforium as at the cathedral of Soissons in the south transept. (Art. Architecture Religieuse, Fig. 31). A beautiful chapter hall and a cloister of the 13 th century accompany at the north side the nave of the cathedral of Noyon.(Arts Cloitre, Salle Capitulaire). Two great t towerr are built on the facade, much disfigured by successive restorations, and whose primitive spires have been replaced by roofs of carpentry, if they were ever built. As for the p porch, it dates from the beginning of the 14 th century; but that part of the edifice presents no interest.

Note 1. p. 304. See Monog. de l'egl. N. D. de Noyon, by M.

canons of Tournay obtained a bull, that pronounced the separation of the two dioceses, and gave to Tournay a separate bishop.

The fire of 1131 was not the only one that attacked the cathedral of Noyon; in 1152 the city was burned, and the cathedral was probably injured; but then either the church of Beaudoin was not begun, or it had scarcely risen above ground, a and the fire could only destroy the temporary structures built so that the worship should not be interrupted during the construction of the new choir. In 1238 fire devastated for the third time a great part of the city. In 1293 a fourth fire b burned the carpentry of the new cathedral and caused considerable damage to it. These successive injuries explain certain peculiarities noted in the construction of the cathedral of Noyon. We shall return to them.

First observe that the plan of the choir of the cathedral of Noyon is accompanied by 5 circular chapels and 4 square chapels; now these chapels are the most ancient part of the entire church. We have seen and we shall see that the plans of cathedrals built toward the end of the 12 th and the beginning of the 13 th centuries, like Notre Dame of Paris, Bourges, Laon and Chartres, are entirely or almost entirely without chapels. But Noyon precedes the great movement, that carries the bishops and the people to erect new cathedrals, yet the plan of Noyon is still subject to canonical or monastic influence, yet finally Noyon follows the construction of the church of S. Denis, whiln likewise possesses circular and square chapels at the apse. If we examine the plan of Notre Dame of Noyon, we see also that at the entrance of the choir,after the transept piers are built two piers of equal thickness. Op-Opposite, the masonry of the side aisle likewise has great strength and contains stairways. Towers commence at that point but were never completed. In the nave, whose construction seems comprised between the years 1180 and 1190, we see 5 nearly square bays supported by piers formed of clustered columns a and separated by monocylindrical columns. This arrangement already indicates vaults composed of pointed arches resting on the great piers with simple transverse arches on the intermediate piers. (Fig. 8). This is indeed the mode adopted for t the construction of the vaults of Notre Dame of Paris, of Bourges and of Laon; yet contrary to that arrangement so well

the conduct of the works to some lay master of the works, because the time wished this, while allowing him to build in the fashion, recommended him to retain something of the old, to recall its appearance in certain parts, and thus all the round arches by which the exterior of the edifice is pierced, those great circular arcades serving as a crown both inside as outside. It is true that the delicate profiles of those arcades make them as light as pointed arcades; the obedience of the lay architect could not be more complete; it consisted in the form and not in the spirit."

Note 1. p. 301. These plans are all at the same scale of 1: 1000. It is understood that when we speak of the south side, it is intended to indicate the right; of the north, it is the left for one looking at the cut, all the cathedrals being orientated in the same manner, with very rare exceptions.

Note 1. p. 302. Monog. de l'egl. de Noyon, by M. L. Vitet. 1845.

"Thus to comply with the memories and the preferences of the canons, the semicircular plan of the transepts was retained, the old church probably had such rounded arms, according to the old Byzantine type. But while retaining that form, they seem to have desired to redeem the antiquity of the plan by an excess of novelty in the elevation. Note indeed that these semicircular transepts are pierced by two rows of pointed windows, while in the nave all the windows are round arched, though evidently later."

"It is also very probable that the rounded form of these t two transepts was retained as a memorial of the cathedral of Tournay, that sister of our cathedral. Indeed at Tournay the two Byzantine transepts remain today in their primitive majesty with their cincture of high and massive columns. In 1153 the separation of the two sees had only been decided for seven years. The memory if those admirable transepts was still entirely fresh, and it is perhaps in witness of its regrets, and as a sort of protest against the bull of the holy father,[1] that the chapter of Noyon desired the transepts of its new c church should recall those of the cathedral it had lost, at l least by their plan."

Note 1. p. 303. The union of the two dioceses of Tournay and of Noyon was maintained until about 1135; at that time the c

capitals and in interiors are ornaments borrowed from the local flora; never or very rarely are figures and sculptured scenes; it seems that the voice of S. Bernard still echoed in the ears of the sculptors.

In our cathedrals the iconography is regulated by the high direction of the bishops; lay workmen no longer fell into the oddities affected by the monks of the 11 th and 12 th centuries. Sculpture sought less to surprise or terrify, than to instruct and explain; it is no longer superstition but faith, poetry and science.

Thus let us state fully this fact; with the need of erecting our great cathedrals originated a new system of construction, a new art appeared, outside the influence of the monastic orders, and almost in opposition to the spirit of those orders.

Let us return to the cathedral of Noyon. It was then about 1150 that it was commenced; the church of S. Denis built by Suger had been dedicated in 1140 and 1144.

We give (Fig. 7) the plan of the cathedral of Noyon.[1] The choir and transepts belong to the structure of Beaudoin; the nave appears to have been finished only about the end of the century. We cannot do better here than to cite M. Vitet,[1] to explain the form of this plan and the pronounced mixture of the round and the pointed in this church in construction.

"When Beaudoin II undertook the rebuilding of his cathedral, there existed at Noyon a commune already long established, c consecrated by peaceful enjoyment, but in some sort placed u under the tutelage of the bishop. The reflection of that situation is presented by the architecture of the church. The new style had already made too much progress at that epoch not to be frankly adopted, especially in a secular edifice and in a city in possession of its franchises, but at the same time the temporal power of the bishop still had too much reality not to form a large part in ceremonial traditions. We do not pretend that this part was regulated by an explicit bargain, nor even that any agreement on that subject intervened; the facts of that kind often occurred almost unknown to contemporaries. H How frequenlty we act without mistrusting that we obey a general law, and yet that law exists, that causes us to act, and others that later we shall mark their existence and appreciate their extent. Thus the bishop and canons, while entrusting

makers charged with preparing this glass made Suger believe, that to obtain glass of a beautiful color, it was necessary to cast into it precious stones; but then this glass must have been made outside the abbey, and Suger have then employed lay artists. We are disposed to believe this tale an exaggeration. Suger as reported by history does not appear to be a man to allow himself to be deceived in such gross fashion. In his o abbey must have been known how stained glass was made.

But before beginniug the description of the monuments, permit us an argument. S. Bernard on several occasions was aroused against the taste of the sculptors found in Clunice churches; his upright, positive and enlightened mind was shocked by these representations of the singularly travestied scenes of the Old and New Testaments, those legends, that barbarous fashion of figuring the vices and virtues, that covered capitals of Romanesque churches. Even at Vezelay in the midst of these i images most strangely sculptured, he had not feared to call these arts barbarous and impious, ho stigmatize them as contrary to the Christian spirit; so when he established the rule of Giteaux, he desired to protest against what he regarded as a monstrosity by abstaining from all sculptured representations.

Souls of the temper of that of S. Bernard are rarely understood by the multitude; when supported by shining virtues, an immovable conviction and an entrancing elequence, although remaining in the midst of society, they exert pressure on its tastes and customs; but as soon as they disappear, those tastes and customs resume their sway; yet there remains an ineffaceable trace of the protest of a convinced mind. Shame a man for his depraved tastes, show him on the odious and ridiculous side, and it perhaps will not correct him, but he will modify the form and expression of his tastes. The protest of S. Bernard happily did not change the tastes of the nation for the plastic arts, but it is certain that it modified them by forcing them to direct themselves toward the true and the beautiful. This revolution occurred just at the time when the arts extended outside the cloister and became the property of laymen.

At S. Denis the eccentricities against which S. Bernard was aroused had already disappeared. In our cathedrals of the 12 th and 13 th centuries remains no lonber a trace. On the cap-

saw , that besides the monastic school was formed a lay school of architects, in our eyes the merit is the same; but what is incontestable is the appearance, new for the time, of the structures built by him at S. Benis. Now we shall find again at the cathedral of Noyon the same construction, the same procedures in stonecutting, the same mouldings and ornaments as at S. Denis. We see there this singular mixture of the round and pointed arches. The chusch od S. Denis of Suger and the cathedral of Noyon seem to have been built by the same shop of workmen. The abbot and the bishop are joined in friendship, Suger is at the head of the country; what more natural than to assume that bishop Beaudoin, seeing him rebuild the church of h his abbey with arrangements and means of construction new for that epoch, turned to him to procure the masters of the works and workmen necessary for the rebuilding of his cathedral ruined by a fire? If there are no proofs in that, it appears to us that there are at least striking assumptions. M. Vitet understood the importance of determining in a rigorous manner the date of the construction of the cathedral of Noyon. That its importance is indeed great, for the cathedral of Noyon is a transition monument and one in advance of its time. It precedes by some years the construction of the cathedrals of Paris and of Soissons. Is it then necessary to see in the church of S. Denis and in the cathedrals of Noyon and of Senlis the cradle of pointed architecture? And Suger, both abbot and mininister, was he the first to seek constructors outside the monasteries, who understood that the arts and sciences were stifled in the cloisters, and could develop no further in their shadow? Here are questions that we leave for solution to those more skilful than ourselves.

Note 1. p. 299. For example, such are the facts relating to the foundations, that Suger is said to have executed with the greatest care; now these foundations are also neglected where possible; as for the columns of the choir brought from Italy, they came from the quarries of the Oise; for the stained glass, into the fabrication of which entered a considerable juantity of precious stones, sapphires, emeralds, rubies and topazes; was this glass, of which we fortunately posses numerous fragments, although very beautiful, certainly is of glass colored by metallic oxides. It will perhaps be objected, that the mo-

In 1131 a terrible fire destroyed the city of Noyon and its cathedral. Bishop Simon, who then occupied the episcopal throne of Noyon, was not in condition to repair the disaster; his finances were exhausted by the construction of the abbey of O Ourscamp; then the movement that some years later caused the higher secular clergy and the faithful to erect cathedrals on vast plans was not pronounced. The sucessor of Simon, Beaudoin II, a prelate filled with foresight, prudent and regular, knew how to administer his diocese with as much wisdom as energy; he was in friedship with S. Bernard and honored with the confidence and favor of Suger. In his excellent archaeological notice of Notre Dame of Noyon, M. Vitet believes that the construction of that church must be referred to the episcopate of Beaudoin, such as we see it today; we not only share the opinion expressed by M. Vitet, but we shall more strongly affirm it, for we base his historical proofs on even surer proofs drawn from examination of the monument itself. We have just stated that Suger honored bishop Beaudoin with a special confidence, and as everyone knows, Suger was strongly interested in the construction of churches, he caused to be entirely rebuilt that of his abbey, and the portions of these constructions remaining to us have a character, recognizable for the epoch in which they were erected. They make a great advance toward the pointed system; they almost entirely abandon Romanesque tradition. Who did Suger employ to erect the abbey church of S. Denis? That would be difficult for us to learn. The illustrious abbot and his successors tell us nothing; they retain for themselves all the honor of the undertaking (and that is intelligible); to believe them the monks sufficed for everything. But in history of that construction are so many fables, facts evidently presented with the intention of impressing the multitude with respect and admiration, that we cannot attach to it actual historical importance.[1] Suger was also a g good politician as well as sincerely religious; he was more than any other able to utilize men, that could supply the epoch in which he lived; he was an enlightened spirit, and as one would say today, a lover of progress. His church proves it; it is 20 or 30 years in advance of the structures then erected, even in the royal domain. Whether he was the first to form that new school of constructors, or whether he first

century. This fact being nearer us and well known will convince, we believe, minds most inclined to doubt. The cathedral of Orleans was destroyed from base to roof by the Protestants at the end of the 16 th century. The people of Orleans desired not only to have a cathedral, but their cathedral which had been destroyed, and it is not the fault of the people if the architects only knew how to erect a bastard monument for them. Certainly we have no intention of giving that edifice as a m model of pointed architecture; but its reconstruction is a m moral fact of great importance. Orleans, the central city of France, had perhaps alone preserved the old national spirit well into the 17 th century; it alone remained attached to its monument, that recalled to it a great epoch, great memories, the first efforts of French society to reconstitute itself. W We have already stated, that if the castles and abbeys were burned and devastated in 1793, all our great cathedrals remained standing, and many were not even mutilated.

The cathedral of Bourges represents to us a hall for a great assemblage even better than the cathedral of Paris, not only in its plan by the absence of the transepts, but in its section by the arrangement of the two galleries, one above the s second side aisle opening into the first side aisle, the other being over the vaults of this first side aisle and opening into the central nave. that was one means of arranging views of the middle of the structure and of permitting numerous spectators to see wha passed in the great nave. Do not lose from sight, that the cathedrals in the 13 th century were not solely intended for worship; men assembled there and deliberated, mystery plays were represented, men pleaded and sold, and secular diversions were not excluded,[1] for example, the festival of t the innocents at Laon celebrated on Dec. 28; the festival of fools, etc.; these farces were suppressed with difficulty, a and we see them still persist during the 15 th century.

Note 1. p. 288. Jean de Courtenai, archbishop of Rheims, in 1260 gave letters of reformation for the cathedral of Laon, in which is read this passage:-- (Latin text). Cartul. Laudun. Essai sur l'eglise de N. D. de Laon, by J. Marion, 1843.

But the arrangements peculiar to the cathedral of Bourges have caused us to leave the chronological course, to which i it is necessary to return to pace order in our subject.

centuries to recognize that of the south portal B, for example, the pier bearing the figure of Christ is of the 13 th century, that the mouldings of the substructure and some columns serving as supports for the statues are of the 13 th century, while the figures of the recessed jambs, lintels and tympanums are of the 12 th. There as at Paris is a collection of precious fragments, a memorial of a former edifice, that it was desired to preserve and insert in the construction itself. Otherwise as at Paris, these sculptures well merit that honor, them are of the greatest beauty.

The upper parts of the cathedral of Bourges show a defect in unity; disfigured today by barbarous restorations not belonging to any epoch or style, one can no longer judge it; but we saw there again fifteen years since as they were left us by the centuries; it seems that successive sums have been used without taking into account the primitive project, it was like a mountain on which each one erects at his pleasure the structure that suits him. Architects called successively to finish or strengthen constructions built with insufficient means, a added there, one a flying buttress, another the pinnacle of a buttress not fully loaded. Certainly whoever conceived the plan and erected the choir as far as to the vaults had projected an edifice, which did not present these superfluities and this confusion; it is necessary to avoid judging the art of the men of the beginning of the 13 th century by what the cathedral of Bourges gives us today.[1]

Note 1. p. 287. The architects of that epoch are daily reproached for having conceived edifices, that were not possible; and confounding styles and epochs, but not taking into account the exhaustion of the financial sources, that dried up at the middle of the 13 th century, they are accused of not knowing how to complete what they had begun. But the architects that erected a cathedral in 1190 could not then suppose (such was the general enthusiasm), that the means at their command should become less. When they could by chance complete the work conceived, we shall see with what strength of means and sustained science they did this. Already the example of the cathedral of Paris given by us proves this; we shall see that it is not the only one. A curious fact causes one to understand the construction of a cathedral at the beginning of the 13 th

moats of the city; there was then a necessity for building a lower story, that produced a remarkable luxury of constructi- on; for of the entire cathedral of Bourges, the lower story is best built; nothing is spared there, neither materials of the best quality, stonecutting nor sculpture, which is of the most beautiful character. But the cathedral of Bourges was d delayed. Its eastern portion only rose above the earth about 1220, and was scarcely carried to the height of the waults of the second side aisle, when resources were less abundant. The construction shows this, and all the upper parts of that imm- ense structure were completed good or bad in haste, and prob- ably by reducing the height of the nave, that we believe to have been projected with a higher section. (Art. Architecture Religieuse, Fig. 34, the section of this cathedral). The front portion of this nave was only finished in the 14 th century, and the summit of the facade with its two towers only about the 16 th. Lateral chapels came to spoil that beautiful plan, and enclose the colossus with a parasitic decoration, but from the end of the 13 th century very few cathedrals of France c could save themselves from this mania for these lateral chapels. The grand primary idea, that caused them to be erected, came from the spirit of the clergy in the course of that century. The societies and guilds, even the families, by giving funds to complete or repair the national monmment, desired to have their chapels; more money was obtained only at that price.

Note 1. p. 294. In 1160 were laid the foundations of the present cathedral of Paris; in 1172 was projected the rebuild- ing of that of Bourges. Bishop Etienne gave to the cleric Odon in that year a place before the portal of the church to build a house, on condition of restoring the site "as soon as the construction of the projected church required this." La cath- edrale de Bourges, by A. de Gerardet and Hip. Durand. Moulins. 1849.

Note 1. p. 295. We have omitted from this plan some chapels added along the side aisle of the nave during the 14 th aud 15 th centuries.

Note 1. p. 296. We have heard the opinion expressed, that these doorways were the remains of a church of the 12 th cen- tury left in place; there is no need to be familiar with the details of sculpture and mouldings of the 12 th and 13 th cen-

aisle was a tribune for reading the epistles and gospels; the stalls of the chapter being in the choir at both sides of the altar. The cathedral in that state, i.e., at a time when it assumed great moral and material importance, approached more nearly the antique basilica than the monastic churches, already furnished with numerous chapels, at least at the apse. It is an immense hall, whose principal objects are the altar and the cathedra, throne of the prelate, a sign of the episcopal justice. The monument thus fully justified what we have said at the beginning of this Article. But a single exception is not a proof; it must be an exception. Let us examine other cathedrals of France of that time.

At Bourges still existed at the middle of the 12 th century a cathedral built during the 11 th, of quite limited dimensions, if one judges by the crypt still existing at the centre of the choir, and that gives the perimeter of the ancient apse. In 1172 bishop Etienne projected the building of a new e edifice.[1] Yet it does not appear that the execution of this great monument was commenced before the first years of the 13 th century. Here is the plan.(Fig. 6).[1] At the apse are only 5 very small chapels; double side aisles as at Notre Dame of Paris; no transepts; the unity of the purpose in this plan is still more marked than in the plan of the cathedral of Paris. Besides the entrances of the facade are arranged two portals at A and B; and (as at the portal of S. Anne of Notre Dame of Paris), these portals are built with fragments of sculpture belonging to the 12 th century.[1] About the middle of the 13 th century were erected two porches before these doorways. Beside are arranged two wide stairways descending to a subterranean church with double side aisles enclosing the old crypt of the cathedral of the 11 th century. The little apsidal chapels do not appear in the lower church; they are borne on corbellings (Art. Chapelle) from piers with two detached columns at the sides. This lower church is not a necessity of the worship but a requirement of the construction; at the end of the 12 th century, the Roman ramparts of the city of Bourges rose at several yards from the apse of the old church, w which did not extend beyond the sanctuary of the present church. Desiring to extend around it the double side aisles, the constructors found themselves compelled to descend into the

works must require several years, considering their importance and the care taken in their execution. In 1297, Matiffas de Buoy, bishop of Paris, commenced the construction of the chapels of the choir between the buttresses of the 12 th century projecting about 5 ft. Also then were rebuilt the great pinnacles of the flying buttresses of that part of the edifice, a and therewere opened in the circular portion of the triforium great windows surmounted by open galleries in place of the w windows previously opened. These works must have beeu terminated about 1310. At the same time the gable walls of the transepts were rebuilt (i.e., about 1260),was rebuilt at the north a flying buttress with double span, the first from the transept. This was an attempt to reconstruct the old flying buttresses of the 12 th century, probably retained until then around the choir, although the upper windows about 1235 had to submit to the same change as that imposed on those of the nave. It was no longer possible to add anything to that vast edifice, completed about 1230 and rebuilt during almost a century. Its plan was not modified after that; we give it here (Fig. 5) as it remains to us. [3] The towers of the facade remained unfinished; the stone spires whose stumps exist inside at the top were never erected. A wooden spire, erected at the beginning of the 13 th century and covered with lead, surmounted the crossing of the transepts until the end of the last (18 th) century. (Art. Fleche). These changes made in a completed monument immediately after its construction give the historw of the programmes of cathedrals, that succeed each other in France during the entire course of the 13 th century.

Note 1. p. 293. Epoch of construction of the S. Chapelle. These chapels present details and mouldings identical with t those of that monument.

Note 2. p. 293. That opening remained on the north side behind the roofs of these chapels.

Note 3. This plan is the existing one with the sacristy built after 1845 instead of the old archbishop's palace at the south.

In the origin were few or no chapels with one principal altar, the throne of the bishop being placed behind at the apse. Entirely around this in the wide side aisles was the multitude; at the entrance of the choir and opening on the transverse a

importance. Instead of repairing the damage to the construction of Notre Dame of Paris, men profited by suppressing the rose windows I pierced over the triforium, extending lower t the high windows, by dropping their sills to the point P (see section in Fig. 2, external elevation in Fig. 3, and the section in Fig. 4), they removed the gutter D, demolished the flying buttresses H I with double spans; lowered the gutter D to the level R, lowering the triangles S of the vaults; on these vaults were laid stone slabs with double slopes; the great w windows A of the gallery were cut as indicated at Q, Fig. 3; and not daring to leave longer the piers K isolated, Fig. 2, that they found insufficiently stayed by the lowered crowns D, they established great flying buttresses of a single span from T to V. The flying buttresses L under the roof being destroyed by the fire were suppressed, and the flying buttresses M alone remained in place in an abnormal position, for they were too high to abut the vaults of the triforium alone. The cornices and upper croyning members X were rebuilt, the pinnacles Z being changed. The high windows being enlarged were furnished with very simple tracery (Figs. 3, 4), whose form and the sculpture give accurately the date of the work. Scarcely was that work completed in haste (for the examination of the construction indicates great haste), than was undertaken the building of the chapels U about 1245, between the projections formed on the exterior by the great buttresses of the nave.[1] These chapels were also erected with great rapidity; their construction had as a result the disappearance of the opening A' (Figs. 2, 3),[2] that admitted light above the vaults of the second side aisle, and rendered the discharge of the w water more difficult. By examining the plan (Fig. 1), one can take into account the injurious effect produced by this addition. The two galleries of the transepts then found themselves exceeded by the projection of these chapels. Compared with t the new external decoration of the nave, these two gables must present a heavy mass; they were torn down in 1257 and were rebuilt anew, as stated by an inscription carved at the base of the south portal. Between the buttresses of the choir three chapels at north and three at south were rebuilt at the same time, including the little red doorway that led into the cloister, to continue the series of chapels of the nave. These

enormous buttresses N, that alone present a considerable volume of materials placed outside the edifice.

Note 3. p. 288. While repairing the upper windows of the n nave of the cathedral during the course of the campaign of 1 1854, we discovered the rose windows opening into the nave a above the gallery of the second story and lighting the roof of that gallery. Fragments of these rose windows could be replaced in the last bay of the nave and the two bays west of the south transept.

Fig. 3 gives the external appearance, and Fig. 4 is the interoal elevation (longitudinal section) of two primitive bays of the cathedral and of a bay modified during the course of h the 12 th century. The section shows with what care the weight of the structure was distributed on the piers, and how already at that epoch constructors sought to avoid walls. Indeed beneath the sills of the great windows A of the triforium, made to be seen from the nave, are arranged discharging arches.

The tradition of Romanesque construction was thus completely abandoned in the cathedral of Paris from the end of the 12 th century; there is nothing more than piers and arches. The system of pointed construction is frankly inscribed in this remarkable monument.

Unfortunatelw this church very soon received important modifications, that came to change its character so simple and grand. Frog 1235 to 1240,[1] a fire not mentioned by history, but whose traces are visible on the monument, destroyed the upper carpentry and the roofs E of the triforium of the cathedral (ee transverse section in Fig. 2 and longitudinal section in Fig. 4); the tracery of the rose windows J was calcined as well as their voussoirs and the parapets O of the great roof. It is probable that the second span I of the flying buttresses and the vaults of the triforium were injured.

Note 1. p. 292. To give these dates we have only the architectural character of the construction; but in Ile-de-France progress is so rapid, that one perceives in the space of ten years changes sufficiently apparent, to be able to fix with certainty the date of the construction.

Already at that epoch other cathedrals had been erected, a and had been pierced by larger windows furnished with brilliant stained glass; this decoration daily assumed greater imp-

those rich and populous cities was probably felt the need of offering the faithful this additional area for days of great ceremonies; but these galleries had also the advantage of allowing the opening of wide windows suitable to light the middle of the nave, and giving greater solidity to the structure.

Note 2. p. 286. The scale of this plan and of those that follow is 1 : 1000.

Note 1. p. 288. The area covered by the church of Notre Dame of Paris was 47,021 sq. ft.; deducting the solids and the sanctuary, there remained about 40,887 sq. ft. in the ground story, able to contain 7500 persons.

Note 2. p. 288. These galleries could contain 1500 persons, assuming them to be placed in only four rows.

The transverse section here presented (Fig. 2) will show the system of construction adopted by the architect of the cathedral of Paris from 1160 to 1220. Recent discoveries of the h highest interest induce us to reproduce this section, already drawn in an incomplete manner in Art. Architecture Religieuse. At A are seen windows of the gallery of the triforium, whose position clearly indicates the intention of giving light in the interior, that the windows B of the double side aisle and the upper windows C would have left in obscurity. But this inclined arrangement of the vaults of the triforium compelled t the raising of the gutter D and consequently the roof E; there remained a space F G, that we assume to be solid, adhering to the first bay of the nave left in its primitive state.[3] Now that interval between the sill of the upper window and the arch of the triforium was pierced by rose windows J with very complete tracery, destined as much to lighten the construction as to give light beneath the roof E. On days of great ceremonies, these rose windows were utilized for decorating the interior of the edifice. The great height of the triforium w wall supporting the gutter D allowed the construction of the flying buttresses H I with doubled spans with an intermediate pier K. Further, the springings of the greater vaults were maintained by lower flying buttresses L bearing the purlins of the roof E. These flying buttresses L were themselves abutted by lower flying buttresses M, which at the same time maintained the vaults of the triforium. This construction, solid, beautiful and also ingenious, was made forever stable by the

gallery connecting the two towers. Evidently at that epoch was an interruption of the work, the style of the top of the facade and the nature of the materials employed cannot cause doubts, that the towers with the great gallery enclosing their bases were erected very rapidly about 1235. Then the cathedral was entirely completed, except the spires that were to surmount the two towers.

Note 1. p. 286. For more complete details see L'Iten. archeol. de Paris, by M. baron de Guilhermy. Paris. 1855.

We give (Fig. 1) [2] the plan of this primitive church without the additions made since that epoch. As may be seen, this vast church was without chapels, or if any existed they were only three and very small, situated behind the apse at L; for we h have found again the external cornice of the double side aisle at nearly all parts of the circumference of this double apsidal side aisle, these chapels could then be opened only below that cornice, and consequently could only occupy but small he- height and little area. We should rather be led to believe, that three altars were placed against the wall of that double side aisle; one dedicated to the Virgin, the other to S. Etienne and the third to the Holy Trinity. But what was particularly desired to obtain by tracing such a simple plan was a v vast space for containing the clergy and the multitude before and around the principal altar placed at the centre of the s sanctuary. At F was a gallery in two stories, whose traces have been found, communicating from the bishop's palace to the choir and to the side galleries over the first side aisle. At G are the 13 steps descending from the place to the bank of the Seine. At the left on the North side against the flank of the facade rose the little church of S. Jean-le-Rond, probably an old baptistery; and from that church to the dotted line A, t the cloisters and dependencies of the cathedral extended quite far. Not much of this vast area was covered [1] in the ground story; as we have just stated, a wide gallery extended around the church over the inner side aisle;[2] it was reached by four great winding stairways with treads of about 5 ft. each. The upper galleries of the same width as the side aisle and vaulted rarely appeared during the first part of the pointed period except in the cathedrals of Ile-de-France; they are found at Noyon, Laon, Soissons. (Art. Architecture Religieuse). In th-

besides, it is the first one begun on a vast plan destined to satisfy the tendencies both religious and political of the end of the 12 th century.

The cathedral of Paris in 860 was composed of two edifices, one under the name of the martyr S. Etienne, the other with the name of S. Marie; we do not know what were the exact dimensions of those monuments, one of which, S. Etienne, was spared by the Normans for a sum of money. The excavations made at the South in 1745 discovered a thick wall extending in a curve beneath the existing chapels of the choir. The visible portion of the circle gives reason to believe, that the apse of the first church had scarcely more than 26 or 30 ft. diameter. About 1140 archdeacon Etienne of Garlande caused important works to be executed at the church of the Virgin. Of these works there remains only the reliefs of the tympanum and a portion of the voussoirs of the portal of S. Anne, replaced at the beginning of the 13 th century, when the existing facade was constructed, probably because these sculptures appeared too remarkable to be destroyed. Besides it was a very usual custom at the time of that enthusiasm, that caused the rebuilding of the cathedrals, to preserve a memorial of the primitive edifice, and the example cited here is not the only one, as we shall see. In 1160 Maurice de Sully, bishop of Paris, resolved to combine the two churches into a single one, and he caused to be consecrated the cathedral that we see today,[1] under the sole name of S. Marie. In 1196 Maurice de Sully died leaving 5000 livres for covering the choir with lead; thus t then the choir was completed as far as the transept, which g goes to confirm the archaeological character of that part of Notre Dame of Paris. There is every reason to believe even t that the nave was then erected as far as the third bay from the towers to some yards above the ground. Eude de Sully, successor to Maurice, continued the work until in 1208, the time of his death. The great facade and the three first bays of the nave were only commenced at the end of the episcopate of Piere de Nemours about 1218; for it was only at that epoch according to the Martyrology of the church of Paris cited by abbe Lebeuf, that were destroyed the remains of the old church of S. Etienne, that obstructed the works. At the death of Philip August in 1223 the portal was completed to the base of the great open

on new plans like those of France; the dioceses of Rheims, S Sens, Chalons, Troyes in Champagne, were the first to follow that movement. In Burgundy those of Auxerre and of Nevers, me nearest the royal doman rebuilt their cathedrals; those of Autun and of Langres being more distant retained their old c churches erected about the middle of the 12 th century.

In Guienne, that remained English except Bordeaux, which m made an effort about 1225, Perigueux, Angouleme, Limoges, Tulle, Cahors and Ageu retained their old monuments.

At the death of Philip the Fair in 1314, the royal domain was eularged; it had absorbed Champagne; it possessed Languedol, the marquisate of Provence; it helf Auvergne and Burgundy in the midst of its provinces. Montpellier, Carcassonne, Narbonne and Lyons executed considerable works in their cathedrals and endeavored to restore them. Clermont in Auvergne sought to follow the example. The English provinces and Provence alone resisted.

At the death of Charles V in 1380, the English only possessed Bordeaux, Cotentine and Calais; but the sap was exhausted; the cathedrals whose reconstruction had not been commenced in the 13 th century remained as they were; they continued unfinished and ended with difficulty.

We have tried to trace briefly a historic survey of the construction of our French cathedrals, however incomplete it may be, we hope that it will cause to be understood the importance of these monuments for our country, these monuments that have been the real basis of our national unity, the first germ of French genius. To our cathedrals is connected our entire intellectual history; they have sheltered in their cloisters t the most celebrated schools of Europe duriug the 12 th and 13 th centuries; they have given the religious and literary education of the people; they have been the cause of a development in the arts only equalled by Greek antiquity. If the last centuries have allowed to perish in their hands these great evidences of the greatest effort in favor of unity during Christianity, let us hope that more just and less ungrateful our own will know how to preserve them.

Since we assume to demonstrate that the French cathedral in the moral sense of the word was born with the monarchical power, it is proper for us to commence by examining that of Paris;

chill? We think not; the nation henceforth feeling a power s superior to feudalism, looked toward it and no longer felt t the lively and pressing need of erecting the cathedral opposed to the feudal fortress.

At the end of the 13 th century, those vast structures that had slowly risen from the ground did not attain this development; they stopped abruptly; if they were completed, this was only by the personal efforts of bishops and chapters, who used their own wealth to finish what the enthusiasm of an entire people had allowed to be commenced. There is not a single cathedral, that was completed as it had been projected, and that is understood; the period during which the great cathedrals had been conceived and erected, that period in which their existence may be termed an imperative necessity, the expression of an irresistible national desire, is comprised between the years 1180 and 1240. Sixty years! If one might be astonished at anything, it is that in brief space of time, there could be obtained over such a great area such surprising results; for this were not only workmen to be found, but thousands of artists, who were mostly men with talent in execution, now a subject for our admiration.

In France, such was then the need of enlarging the cathedrals, that even during their construction the first partly executed works were sometimes destroyed to give place to grander projects. Outside the royal domain the movement did not exist, and only later about the end of the 13 th century, when the monarchy had nearly reunited all provinces of Gaul to France, that men undertook the rebuliding of the cathedrals. Then some dioceses replaced their old monuments by new structures erected on plans brought from the royal domain. But this movement was restricted and timid, and it was soon stopped by the political misfortunes of the 14 th century.

At the death of Philip August in 1223, the principal cathedrals comprised in the royal domain were those of Paris, Chartres, Bourges, Noyon, Laon, Soissons, Meaux, Amiens, Arras, Cambrai, Rouen, Evreux, Seez, Bayeux, Coutances, Mons, Angers, Poitiers and Tours; now all these dioceses had rebuilt their cathedrals, whose construction was then very advanced. It certain dioceses were politically united with the royal doman a and recognized their vassalage, their cathedrals rose rapidly

end; yet it was precisely at the moment when the bishops made common cause with the monarchy, desiring to separate themselves from feudalism, that they find enourmous resources, whose use will allow them to enlarge the area of their cathedrals to contain the entire population of the cities. Then the cathedral not only exceeded the largest abbey churches, but it a adopted a new architecture; its plan is no longer that of the monastic church; it speaks a new language; it becomes a book for the multitude, instructs the people at the sae time it s serves as an asylum for prayer.

We are now going to study on the monuments themselves the phases of this movement manifested about the end of the 12 th century.

Let us proceed. The alliance of the clergy with the monarchy did not delay in disquieting the barons; S. Louis soon recognized that the royal power only changed its master. In 1235 the nobility of France and the king assembled at S. Denis to set bounds to the power that ecclestiastical tribunals had s seized. In 1246 the barons drew up an act of union"and named a commission of the four most powerful among them,[1] to decide in what case the baronage must take up facts and cases for all nobles molested by the clergy; further each lord agreed to p place in a common fund the hundredth part of his income, in order to pursue actively the purpose of the union. Thus is e evident the attatude of the clergy when S. Louis ascended the throne: it was hostile and menacing."

Note 1. p. 283. Int. de S. Louis. Count Bergnot.

In the midst of these dangers by his conduct both firm and prudent, the sainted king knew how to restrain the excessive pretensions of the clergy within proper limits, and to make the royal authority prevail over feudalism. From 1250 the people being reassured by the predominance of the royal power, accustomed to regard it is the representation of the national unity, finding under its shade authority with justice, no longer exhibited the same enthusiasm to cast into one of the scales of the balance those treasures, which fifty years earlier had permitted the beginning of the cathedrals in colossal proportions. Thus from that epoch we see these structures retarded, or completed in haste at a smaller scale, atrophied, so to speak. Is it necessary to attribute that to a religious c

Therefore as every judicial contest may have its source in fraud, the clergy claimed the right of judging every suit' real, personal or mixed affairs, feudal or criminal cases. The people did not regard these invasions with an opposing eye; they found in the ecclesiastical courts a mode of procedure less b barbarous than that employed in the feudal courts; combat was never admitted, an appeal was received; the canon law was followed there, and which approached in many respects the Roman law; in a word, all the legal guarantees refused by the tribunals of the nobles, one was certain to obtain in the ecclesiastical courts." Then sustained by the already powerful monarchical power, strong in the sympathies of the people, who turned quickly to the ends that showed them a hope of enfranchisement, the bishops desired to give visible form to a power, that thenceforth seemed resting on immovable bases; they collected enormous sums, and tearing down the old cathedrals already too small, they employed without delay these in the construction of immense monuments built to gather around their e episcopal thrones these peoples desirous of freeing themselves from the feudal yoke. That occurred under the reign of that prince, Philip August, and indeed we see commenced and rapidly erected the great cathedrals of Soissons, Paris, Bourges, Laon, Amiens, Chartres, Rheims. Then also the religious architecture leaves its long monkish character; it was not from the monasteries that the bishops sought their architects, but from the lay people whose treasures were brought with enthusiasm, and were to serve to erect the first really popular edifice opposed to the feudal castle, and that ended by vanquishing it.

Note 1. p. 282. Lettre 78.

Note 2. Inst. de S. Louis. Le comte Beugnot.

We do not wish that this origin both political and religious givey by us for the great cathedral could make assured, that we pretend to diminish the value of that spirit manifested in France at the end of the 12 th century. There was in the high selucar clergy of that epoch too grand an idea, whose results have been too vast, for one not to take its source in religion; but it should not be forgotten, that among growing peoples religion and politics are equal; it is not possible to separate them; besides facts speak for themselves. Men were as religious in France at the beginning of the 12 th century as at the

nationality, the first and most powerful endeavor for unity. If in 1793 they remained standing with rare exceptions, this was because a sentiment remained in the hearts of the people, in spite of everything done to tear it away.

Where do we see the great cathedrals arise at the end of t the 12 th and the beginning of the 13 th centuries? In cities like Noyon, Soissons, Laon, Rheims, Amiens, that had all first given the signal for the enfranchisement of the communes; in the capital city of Ile-de-France, Paris, the centre of the most beautiful province conquered by Philip August. But it is necessary for us to enter on this subject with some explanations.

At the beginning of the 12 th century the feudal system was established; it enclosed France in a network with every mesh strongly knotted, seeming never to allow the nation to develop itself. The regular and the secular clergy had not protested against this system; it was associated with them; yet as feudal lords the abbots of great monasteries retained a sort of independence in the midst of the feudal organization, because of the excessive privileges they enjoyed. It was not the same with the bishops; they had not profited by the exceptional position that the spiritual power gave them, they ranged themselves under the banners of their feudal lords, like the lay nobles. "Who is not surprised," said S. Bernard,[1] "to see the same person, that sword in hand commands a troop of soldiers, when clad with the stole can read the Gospel in the midst of a church?" But the bishops did not suit the character with which they were clothed. When the monarchy had allowed its intention to appear, of subduing feudalism, "the clergy easily felt,[2] that in the ensuing struggle the nobles would be vanquished; therefore it broke with them, separated its cause from theirs, renounced every agreement, laid aside its warlike manners, and even abjuring every remembrance, it did not fear rivalling the throne in ardor, to despoil the nobles of their prerogatives. It began by extending its jurisdiction beyond all limits, which in its origin was entirely spiritual; for this a bad argument sufficed, whose success was prodigious; that the Church by virtue of the power given it by God must assume to take knowledge of all that sinned, so as to know whether it should remit or retain, bind or loose. There-

Therefore as every judicial contest may have its source in fraud, the clergy claimed the right of judging every suit' real, personal or mixed affairs, feudal or criminal cases. The people did not regard these invasions with an opposing eye; they found in the ecclesiastical courts a mode of procedure less b barbarous than that employed in the feudal courts; combat was never admitted, an appeal was received; the canon law was followed there, and which approached in many respects the Roman law; in a word, all the legal guarantees refused by the tribunals of the nobles, one was certain to obtain in the ecclesiastical courts." Then sustained by the already powerful monarchical power, strong in the sympathies of the people, who turned quickly to the ends that showed them a hope of enfranchisement, the bishops desired to give visible form to a power, that thenceforth seemed resting on immovable bases; they collected enormous sums, and tearing down the old cathedrals already too small, they employed without delay these in the construction of immense monuments built to gather around their e episcopal thrones these peoples desirous of freeing themselves from the feudal yoke. That occurred under the reign of that prince, Philip August, and indeed we see commenced and rapidly erected the great cathedrals of Soissons, Paris, Bourges, Laon, Amiens, Chartres, Rheims. Then also the religious architecture leaves its long,monkish character; it was not from the monasteries that the bishops sought their architects, but from the lay people whose treasures were brought with enthusiasm, and were to serve to erect the first really popular edifice opposed to the feudal castle, and that ended by vanquishing it.

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profited with as much promptness as intelligence. They comprehended that the moment had come to reconquer the power and influence given them by the Church, and that in part had fallen into the hands of the religious establishments. What the abbeys did during the 11 th century, the bishops could not have done; but in the 12 th century the task of the religious establishments was fulfilled; monarchical power had increased, civil order tried its powers and desired to establish itself. Then the episcopate undertook to rebuild and did restore its cathedrals; and it found in the people such energetic assistance, that it must perceive its foresight to be correct, that its time had come, and that the activity developed by the religious establishments and by which they profited, would come to its assistance. Indeed nothing today, unless it is perhaps the intellectual and commercial movement that covers Europe with lines of railways, can give the idea of the enthusiasm with which the urban peoples aimed to erct cathedrals. We do not pretend to demonstrate that the faith did not largely take a great part in this movement, but it added thereto a very accurate instinct of unity, of civil establishment.

At the end of the 12 th century, the erection of a cathedral was a need, because it was a striking protest against feudalism. When an instinctive feeling thus impels peoples toward an end, they perform labors, that later when this sort of fever has passed, seem the results of efforts performing prodigies. Under an absolute theocratic rule men erected the pyramids, excavated the hypogeums of Thebes and of Nubia; under a military and administrative government, like that of the Romans during the empire, they covered conquered countries with roads, cities and monuments of public utility. The need of e emerging from barbarism and anarchy, for clearing the soil, caused the erection of the abbeys of the West in the 11 th century. Monarchical and religious unity, the alliance of these two powers to constitute a nation made arise the great cathedrals of the North of France. certainly the cathedrals are religious monuments, but they are particularly national edifices. The day that the French community gave its hoards and its treasures to erect them, it desired to establish itself and was constituted. The cathedrals of the 12 th and 13 th centuries are then from our point of view the symbol of French

episcopal jurisdiction is then the actual tie connecting the antique baselica with the Christian church. The cathedral is not merely a church appropriated to divine service, it preserves the character of a sacred tribunal, and retains much more than in the first centuries of Christianity, and since then the civil establishment was not perfectly distinct from the religious establishment, it would result that the cathedrals long remained edifices both religious and civil until in the 14 th century. men gathered there, not only to attend the divine offices, but held assemblies there, that had a purely p political character, it is unnecessary to state that religion almost always participated in those great civil and military assemblages.

Note 1. p. 279. (See Latin text). Ducange. Gloss.

Note 2. p. 279. There still exist some of these episcopal thrones. In France at Avignon is to be seen one in the cathedral church, it is of marble and was removed from its primitive place to be placed at the right of the altar. In the cathedral of Augsburg the episcopal throne has remained in its p place at the back of the apse, like those still to be seen in the basilicas of S. Clement and of S. Lawrence (without the walls) at Rome. (Art. chaire).

Note 1. p. 280. At Lyons the episcopal throne still occupied a century since the back of the apse of the cathedral, and the altar was without ornaments above the table; a cross and two candles alone were placed there.

Until the end of the 12 th century, cathedrals had no extraordinary dimensions; many abbey churches were of greater extent; because until that epoch the feudal division was an obstacle to the civil establishment of the people; the influence of the bishops was restricted by the great religious establishments of the 11 th century. Powerful proprietors enjoying extensive prilileges, feudal lords protected by the popes, h having in hand the education of youths, participating in all great political affairs, the abbots attracted all to themselves, wealth and power, intelligence and activity. When the u urban populations, educated and enriched, allowed the appearance of the first signs of freedom, erected themselves into communes, there occurred a reaction against monastic and secular jurisdiction, by which the bishops aided by the monarchy,

episcopal jurisdiction is then the actual tie connecting the antique baselica with the Christian church. The cathedral is not merely a church appropriated to divine service, it preserves the character of a sacred tribunal, and retains much more than in the first centuries of Christianity, and since then the civil establishment was not perfectly distinct from the religious establishment, it would result that the cathedrals long remained edifices both religious and civil until in the 14 th century. men gathered there, not only to attend the divine offices, but held assemblies there, that had a purely p political character. it is unnecessary to state that religion almost always participated in those great civil and military assemblages.

Note 1. p. 279. (See Latin text). Ducange. Gloss.

Note 2. p. 279. There still exist some of these episcopal thrones. In France at Avignon is to be seen one in the cathedral church, it is of marble and was removed from its primitive place to be placed at the right of the altar. In the cathedral of Augsburg the episcopal throne has remained in its p place at the back of the apse, like those still to be seen in the basilicas of S. Clement and of S. Lawrence (without the walls) at Rome. (Art. chaire).

Note 1. p. 280. At Lyons the episcopal throne still occupied a century since the back of the apse of the cathedral, and the altar was without ornaments above the table; a cross and two candles alone were placed there.

Until the end of the 12 th century, cathedrals had no extraordinary dimensions; many abbey churches were of greater extent; because until that epoch the feudal division was an obstacle to the civil establishment of the people; the influence of the bishops was restricted by the great religious establishments of the 11 th century. Powerful proprietors enjoying extensive prilileges, feudal lords protected by the popes, h having in hand the education of youths, participating in all great political affairs, the abbots attracted all to themselves, wealth and power, intelligence and activity. When the u urban populations, educated and enriched, allowed the appearance of the first signs of freedom, erected themselves into communes, there occurred a reaction against monastic and secular jurisdiction, by which the bishops aided by the monarchy,

the quarrying of stone; if this policy did not formerly have a uniform effect over the entire surface of France, one cannot doubt on examining old abandoned quarries, that each religious centre, or perhaps each province, had its own; for almost always in those old quarries are found traces of systematic quarrying. The same fact struck us when we visited the ancient quarries of Italy and Sicily. And indeed if the mediaeval constructors broke with the forms of antique architecture, they retained the practical spirit far more than one would believe. What cannot be too frequently said is that just the exclusive amateurs of the antique form since the Renaissance have scorned those good and wise traditions retained by the mediaeval architects. It is probable that the master of the works, Pierre of montereau (to see the admirable materials chosen for building the S. Chapelle, one can assert), went to the quarry, and desired to learn where and how were quarried the great b blocks, that he would use.

CATHEDRALE. Cathedral.

From cathedral, what signifies a seat or episcopal throne. A cathedral is understood as the church in which is placed the throne of the bishop of the diocese.[1] In the primitive churches the throne of the bishop (cathedra) was placed at the back of the apse and on the axis, like the bench of the judge of the antique basilica, and the altar rose at the front of the platform, usually over the tomb of a martyr.[2] The bishop was surrounded by his clergy and found himself behind the altar without reredos, then he looked in the face of the officiant. (Art. Autel). This primitive arrangement explains why in certain churches until the middle of the last (18 th) century, the high altar was only a simple table without steps, tabernacles or reredos.[1] The cathedral of the Christian world, S. P Peter of Rome, still retains the seat of the prince of the a apostles enclosed within a throne of bronze at the back of t the apse. In the cathedral churches, in this place reserved for the cathedra, the bishops performed ordinations. When they were invited by the abbot of a monastery, a cathedra was placed at the back of the sanctuary. On that day the abbey church was a cathedral. The episcopal throne was and still is the s sign and symbol of the jurisdiction of the bishops. The epis-

traces of transportation in provinces very distant from each other, and selection of materials in regard to the position occupied, indicating a system of quarrying pursued methodically; but we have occasion ho enlarge on this subject in Art. construction, to which we refer our readers. For example, it is certain that the mediaeval quarriers must have possessed a simple method for quarrying stones of great length, although of small thickness and width.

During the 12 th and 13 th centuries, men used in construction with extraordinary profusion little columns, mullions of windows, whose diameters do not exceed 8 ins. and whose length varies from 13 to 16 ft. and sometimes more; but today we often have difficulty in having materials quarried to fill these conditions, from the same quarries from which they were formerly taken in great quantity. In that as in many other things our progress, of which we are so proud, strongly resembles i inferiority in practice.

Until the 15 th century the saw was not employed to divide hard stone; the stone coming from the quarry in the dimensions required by the constructors; there were then necessary to q quarry and transport those long blocks, precautions and resources neglected or lost. It is probable that to obtain those long and thin stones, they employed a procedure still used in some provinces of France, and that consists in making a narrow cut in the ledge to be split; placing in that cut at certain distances wedges of ash dried in an oven, on which water was allowed to fall in drops; the wedges swelled by the moisture penetrating them uniformly, and caused the block to split off lengthwise, without risking fracture in pieces, such as would certainly result by striking on iron wedges. Too scornful of the past that we permit to be traduced by some narrow and idle minds, we neglect today those details, that formerly with reason occupied constructors. If architects consider one of their duties to be to examination and visits to quarries, they do not seek any influence on the manner of working them; this we believe to be a great error; for the quality of the stone sometimes depends as much on its location as on the procedures employed for quarrying it, or the season during which it is quarried. Many quarries are injured by ignorant or unskilful quarriers, and it would be a service to establish a policy for

the said bridge."

At an epoch when no uniform legislation existed, suitable f for regulating the opening of quarries, these strifes were f frequent, the abbeys, feudal lands, owners of the soil, required payment for the right of using their lands, or required a gratuitous cartage of a part of the materials quarried for their private use. Frequently even the monasteries caused quarries to be opened and sold the materials. The hills of the quarry of S. Denis belonged to the abbot and monks of S. Denis; they also possessed quarries near Pontoise. The abbeys of Royaumont, of Val-sur-Oise, profited by the vast and fine quarries with which their ground is filled. Religious establishments frequently obtained a considerable resource from quarrying the stone, for they took care as far as possible to build their monasteries in the vicinity of calcareous deposits; and on the soil of France, one can be assured of finding near the abbeys good soil, water courses and stone suitable for building. Famous manufacturers and constructors, the monks were t the first to open the ground and to make it yield everything necessary for the needs of a civilized people. The structures left us by them show that the means of quarrying employed by them were well organized and of great power, for it is not r rare to find in the abbey churches enormous blocks. Thus for example one sees in the choir of the abbey of Vezelay monolithic columns, that cube no less than 141 cu. ft.; those columns came from the quarries of Coutarnoux, that are 17.5 miles distant from the abbey, and it was necessary to take those b blocks to the summit of a steep mountain with vast effort. In many churches of Burgundy, of Maconnais, one finds monoliths, that in volume are not inferior to the former. One cannot doubt that attention of the monks was devoted in a very particular mannerto the working of quarries, for they knew how to obtain choice materials in great quantity, and to transport them by mechanical means so powerful as to cause our astonishment to day.

We have not yet been able to learn whether there did not e exist in the 12 th and 13 th centuries guilds of quarriers, as there existed guilds of bridge constructors (pontifices); the sight of the monuments causes us to believe it, for we have found on examining materials of great volume, identical

of M. Millard at Troyes, whose products are beautiful; the m manufactory of glazed terra cotta of Langeais. We refer our readers to the work of M. Alfred Rame cited above for more ample data on this special article.

CARRIERE. Quarry.

This word was originally employed like "road on which a car can pass," then for a place where is obtained stone for building. From all time in France, stone has been quarried either in the open air or in galleries excavated underground. The h hill of S. Jacques at Paris was completely excavated by Parisian constructors since the first centuries of Christianity. From that hill and the vicinity of Arcueil were taken all the limestone materials employed in the structures of the city, and particularly those serving for the erection of Notre Dame. Then as now for raising the limestone beds were used windlasses furnished with great wheels at the opening of the shaft. We find in the collection of Olim,[1] some decrees concerning the quarrying of stone for building; they relate to indemnities to be paid by the quarriers or constructors for repairs to the damaged roads. We will cite here a fragment of one of those royal decrees that dates from 1273.

Note 1. p. 277. Les Olim, doc. ined. sur l'hist. de France. Vol. 1.

"Meantime the abbot and monks of the monastery of S. Port complained, that those who repaired the bridge of Melun came on their lands, and had excavated there to make a quarry, from which in spite of the monks they removed the stone required for the construction of the said bridge' that even by this a considerable wrong had been done to them by almost entirely destroying a road by which persons came to their abbey; that is why the monks demand the pursuit of these quarriers to cause the abuse to cease, and to make them repair the damage c caused to the monastery. The bailiff of the Seine was then r requested to cause the repair of the road in such manner, that the monks could easily and in all security go to the abbey as before, and to indemnify them for the damages, that they had suffered by the opening of the said quarry; namely by paying them in royal deniers a sum equal to that of the stone removed, or by causing that sum to be restored by the contractors for

During the 16 th century pavements of inlaid bricks are still found, and we found a beautiful specimen of them in the c city of Troyes. [1] But then appeared pavements of painted tiles in which white, blue, yellow and green tones dominate. Everyone knows the tile pavements of the chateaus of Ecouen, Blois, the church of Brou; however we shall cite one surpassing all that we have seen from that epoch; this is the faience pavement of the chapel situated North of the nave of the cathedral of Langres. It is difficult to find a decoration of paving at the same time richer, better composed, and more harmonious in colors.

Note 1. p. 273. From the church of S. Nicolas at Troyes. T This tile pavement is composed of circular tiles enclosed within square tiles with cutout quadrants, and representing the monogram of Christ enclosed by the crown of thorns. The date of 1552 is inlaid below the monogram.

Men were not satisfied in the middle ages with making mosaic tiles or those inlaid with clay of different colors, but also made them with designs in relief. This sort of pavements could only be executed with very hard clays, for otherwise the designs would have quickly been worn off by shoes. These designs in relief had the advantage of preventing a slip on the surface of the pavement; but it would be difficult to keep it in a good clean state, the dust being collected by the rough places of the design.

We posses a specimen of tiles made after this system and t that appears to us to belong to the 15 th century. [1] Fig. 17 gives the design; the projections are not over an eighth inch; the clay is very compact, well tamped and well burned.

Note 1. p. 274. These tiles were given to us by M. Mallay, architect of Puy-de-Dome; they came from Riom.

Faience pavements were still employed in France during the 17 th century, and their use was continued in Italy, Spain, Africa and the Orient until our days. With us, they are no longer employed except for kitchen ranges, and in the South for bathrooms or offices. [1]

Note 1. Some makers of tiles have revived the art of glazed tiles with success. We shall cite among other manufactories, that of M. Dubois at Paris, who furnished the new tile pavements of the church S. Denis, restored from old fragments; that

mosaic design, that causes splendor in the midst of that rich composition. The red and yellow tiles are varied in each compartment, and their designs are combined in fours, or are complete in each tile.

Note 1. p. 270. These tiles are now deposited in the old abbey of Premontre, and have sides of 4.7 ins.; they were given to us by M. de Violame. They certainly served for paving the halls of the castle of Coucy, which date from the first half of the 13 th century.

Note 1. p. 271. Ann. archaeol., pub by M. Didron, Sr. Vol. 11. p. 65. We refer our readers to the beautiful plates of that collection; they give the whole of that tile pavement.

In the 13 th century the design of inlaid tile pavements is still large and simple in general arrangement; they become m more confused and meagre during the 14 th century. A difficulty of a nature to embarras archaeologists, when it concerns recognizing the epoch of tile pavements, frequently presents itself after the 13 th century. The makers possessed in their workshops the wooden stamps for imprinting the design intended to decorate the tiles, and used them long after these stamps were cut, tile pavements in the 14 th century being frequently fabricated with stamps made in the 13 th; that explains why one finds in tile pavements evidently laid at a certain epoch specimens of tiles much older than the edifices to which they belong. In decorative principles tile pavements were modified little from the 13 th to the 15 th centuries. their designs became more meagre, at the end of the 14 th century was introduced in tile pavements a profusion of ciphers, inscriptions, shields of arms, sometimes even little views; there appeared tones of green and ,ight blue; black becomes more rare.

Here (Figs. 14, 15) are two portions of tile pavements of that epoch, that came from excavations made in 1840 in the g gardens of the building of the Archives at Paris (old mansion Soubise), and whose red designs on yellow are executed with rare perfection. Fragments of a border of blue and white were discovered at the same time.

Tile pavements of the 14 th and 15 th centuries abound; the cities of Champagne, Brie and Burgundy are still filled with them, and special works on this subject sufficiently numerous, that we shall dispense with repsoducing them.here.

operations, and slow manual labor. In the 13 th century men were contented with stamped red bricks inlaid with light yellow clay and covered by transparent glaze. Sometimes the light clay forms the ground, but more frequently forms the design; in both cases, the process of manufacture is the same. The b black tiles, to be inlaid like those of S. Pierre-sur-Dive, required five successive operations besides burning:-- 1, moulding the tiles; 2, a primary covering of fine clay blackened by a metallic oxide, 3, the stamping of the design as a cavity; 4, the filling of the hollow with light clay and tamping; 5, the glazing. The red tiles inliad with white required only f four; 1, moulding the tiles; 2, stamping; 3, filling the cavity and tamping; 4, glazing. Thus during the 13 th century b black tiles are generally plain, and are only employed as enclosures. The glazing of the tile pavements of the 13 th century is always colored yellow, like that of the 12 th; it contributes thus splendor to the white and red.

Inlaid tiles of brick red, so much in vogue in the 13 th c century form isolated designs or in four parts. It is unnecessary to demonstrate how this system permits invention of infinite designs.

Here are tiles inlaid and glazed from the castle of Coucy, made according to this statement. Fig. 9 presents two tiles with isolated designs; one of them is a shield of arms. Figs. 10 and 11 each are a combination of four tiles completing a circular design. [1] The fabrication of these tiles is rude; we are very far here from the refinement and purity of the tiles of S. Pierre-sur-Dive. But still in simplifying the execution to obtain more numerous products in less time of making, the 13 th century knew how to make admirable tile pavements, and we shall cite among others those of the chapels of the cathedral of Laon, some specimens of which we give here (Figs. 12, 13), and the beautiful pavement of the hall of the treasury of the old cathedral of S. Omer, entirely reproduced in Annales archaeologiques of M. Didron. [1] The latter tile pavement dates from the end of the 1? th century, and presents a series of compartments of 16 red tiles inlaid with yellow and with enclosures of plain black. The compartments are set diagonally and the tiles have about 4.7 ins. sides. In pairs the compartments offer a mixture of black and white tiles with very fine

The tile pavement of S. Pierre-sur-Dive has yellow in laid in brownish-black; it conforms in color to the mosaic pavements of the 12 th century, where black dominates and where red is merely an accessory when one meets with it. The procedure of making the tile pavement of S. Pierre-sur-Dive merits being mentioned; it consists in a layer of fine black clay placed on a coarse red clay, stamped and inlaid with yellowish clay and covered by transparent glaze; the design of these tiles is b black on yellow or yellow on black. The light yellow clay penetrates through the brown coating and is inlaid even in the red clay, as indicated by the section (Fig. 7); the glaze being saffron color gives a golden gleam to the white clay.

We present (Fig. 8) a portion of the circle in glazed terra cotta from S. Pierre-sur-Die, which is certainly one of the beautiful compositions of this kind. The tiles forming this circle exceed the ordinary dimensions; some have sides of 7 ins., the octagonal ones in the corners are even 9 ins.

One may still see in chapel S. Michel of the old collegiate church of S. Quentin a tile pavement of the end of the 12 th century, likewise composed of bands of stone enclosing bricks of dark brown color. Likewise at S. Denis, if we believe the sketches of M. Percier, some tile pavements of the chapels present enclosures of plain stone. This system thus appears to have been adopted in the 12 th century, while in the 13 th century the two materials being no longer combined, the terra cotta pavement without mixture covers the rooms for passing, for which it reserved, and stone slabs are no longer mixed t therewith.

As we have already stated, red dominates in the tile pavements of the 13 th century, also the procedure of manufacture changes and is simplified. It is to be noted, that in all the arts and industries connected with architecture, the 12 th has a great superiority over the 13 th century in execution; stained glass, paintings, sculptures, inlaid slabs and tile pavements of the 12 th century, and we shall even say the same of the construction of edifices, that indicates a care and seeking, that the 13 th century soon abandoned, preoccupied by its grand conceptions. The procedure of fabrication of the tile pavements of the 12 th century, whether composed of combined or of glazed tiles, required a great number of successive op-

scrupulous accuracy in Annales archaeologiques. [1] The tile p pavement of S. PierreSsur-Dive (near caen) is composed of a great rosette of concentric tiles intersected by a cross of stone slabs and bordered by the same. We entirely share the o opinion of M. Alfred Rome, who contrary to that of M. de Caumont admits this combination of stone slabs and terra cotta tiles as being of the primitive epoch, i. e., of the end of the 12 th century. The irregularities observed in the pavement prove only that there was no rebuilding but simply restoration; we have further noted very frequent defects in setting in all old tile pavements. That is easy to explain; the makers sent on order a certain number of tiles long since burned and stored; when they were set, except by deciding to make a partial and special order, and to await a new burning, which would d delay completion of the paving for two or three months, it was necessary to decide to use as they were th tiles sent by the brickmakers; hence frequently combinations commenced with one design and finished with another, tiles set at random or ranged without relation to each other. At S. Pierre-sur-Dive, t the principal subject of the central rosette intersected by stone slabs is regular, but the great square border that encloses it is only composed of rows of bricks of various patterns, mostly of the same epoch still and very beautiful. Besides, it is necessary to recognize that the artists of the middle ages were not imbued with that need of precise symmetry, that becomes the law today; they were guided by an entirely opposed idea, variety. Nothing is more common than to see in the old tile pavement, until the epoch of the Renaissance, these mixed designs, these unequal divisions of bands, borders and compartments.

Note 1. p. 266. Ann. archaeol. pub. by M. Didron Sr. Vol. 12. p. 281. M. Alfred Rome publishes at this time a special work on glazed tile pavements.(Etudes sur les carrelages historiés du XII au XVII siecle). This work is accompanied by n numerous plates executed with the greatest care, and cannot be too strongly recommended. It is a complete study of this i important part of the decoration of edifices in the middle a ages. One of our young architects, M. Ame, also publishes a volume containing the most beautiful tile pavements of the provinces of Burgundy and Champagne.

burned terra cotta mosaic by tiles inlaid with ornaments. The origin of this method of ~~thisimethod of~~ manufacture is easily discovered; from the Merovingian epoch bricks were burned for paying showing sunk designs more or less complex; these designs were produced by a stamp inmressed on clay while still s soft. One finds in the church of the old priory of Laitre-sous-Amance, dedecated in 1076, tiles not glazed but simply stamped. "These bricks are square or oblong [1]; the latter are 3.5 ins. wide by 7.0 ins long. They present straight lines intersecting to form squares, or scrolls enclosed between two bands charged with hatchings. The oblong bricks form enclosures within which are placed beside each other a certain number of square bricks.

Note 1. p. 265. See Essai sur le pavage des eglises ant. au XV siecle, by M. Deschamps du Pas. (Ann. Archaeol. Vol. 10). Bull. monument. of M. de Caumont. 1848. p. 712.

We found in excavations made at S. Denis some tiles thus e engraved with circles and lozenges covered by a soft glazing, opaque and dirty white, produced by a thin layer of clay more fusible than the body of the brick. Here is a copy at half s size of the tiles thus stamped,taken from excavations made on the site of the old church S. Colombe at Sens, and whose date seems very old.(6). [2] They are composed of a light yellowish clay, very resistant but without covering. From the time that men possessed tiles with sunk hollows, it was natural to fill that hollow with clay of another color, and to cover the whole by a transparent glaze: it was done from the 12 th century a and perhaps earlier than that ecoph; that method of fabrication became general in the 13 th century. By this procedure, a assuming the glazing removed, the inlaid clay having a thickness of several 16 ths inch, the tile long retained the design. The hollows of the floor being filled, dust was no longer caught by them, and these pavements could be kept clean by w washing and sweeping them. Placed in chapels or chapter halls, or in internal apartments only entered with soft and light s shoes, one did not risk slipping on their glazed surfaces.

Note 2. p. 265. The monastery of S. Colombe, founded in 630 by Clotaire II, is situated at 1.2 miles from Sens. These bricks appear to belong to those primitive structures.

One of the oldest inlaid tile pavements known is that of t the church of S. Pierre-sur-Dive; it is reproduced with scrup-

assembled; they are black and red; the little pieces C are a alone bordered by a white line. One will note that in all the examples that we have just given here, the greenish-black plays a great part; it is one of the characteristics of the tile pavements of the 12 th century, while in the 13 th century the red dominates. As a general rule in interior decorationsin the 12 th century, the pavements have a very sustained and strong tone, while the paintings are light; green, yellow, red ochre and white are the colors preferred. In the 13 th century on the contrary, horizontal surfaces and pavements are bright and light, while the paintings on surfaces are very vigorous in tone, and it is even not rare toward the end of the 13 th and during the 14 th centuries, to see black occupy important surfaces in the decoration of vertical areas. (Art. Peinture).

But it is not only by harmony of the tones, that tile pavements of the 13 th century differ from those of the 12 th, it is also by the mode of manufacture, in that as in everything, the 13 th century frankly breaks with traditions; instead of composing designs of tile pavements by means of piers assembled in various forms, it adopted a system of tiles usually s square, ornamented by means of inlays of clay of different c colors, red on yellow or yellow on red. Black tiles were then employed most frequently as an enclusure; greenish-black became rarer, to reappear in the 14 th century. The examples of tile pavements of the 13 th century abound in our old churches, in castles, palaces and houses. However it is necessary to s state that tiles of terra cotta burnt and glazed are rarely e employed except in choirs, chapels, or halls not built to receive a great assemblage of people. The glazing being removed quite easily by friction of shoes, glazed tiles were not used in naves or side aisles, in the galleries or great halls of castles or palaces. If the burned terra cotta was placed in much frequented places, it was set without glazing, and frequently alternated with slabs of stone and even marble tiles. Besides it should not be forgotten, that at the change from the 12 th century the ground of naves served for burial, and that being displaced continually and recovered by memorial s slabs, it was scarcely possible to maintain there a general design composed of little pieces of terra cotta.

We have stated that the 13 th century replaced pavements in

square pieces, or of bits not over 1.2 ins. on a side. [1] We even find in the pavement of the chapel S. Gucuphas of the church S. Denis yellow fleurs-de-lis on a greenish-black ground so combined. (2). Fig 2 presents the arrangement of the pieces by which is formed this sort of mosaic. Sometimes the pieces are penetrated by a little bit of terra cotta of a different color, that fits in the hollow arranged to receive it. (3). These examples are taken from the same chapel, all the pavement of which is yellow and greenish black.

Note 1. p. 262. We have rendered black or dark green tones by black, red by hatching, and yellow by white. The red is t the color of brick, the yellow is a very soft tone of light ochre.

M. Percier has left us among his precious sketches made in 1797 in the church S. Denis some of those mosaic pavements of the 12 th century, whose composition is so original. We give here (4) one of the most beautiful; the accuracy of these sketches is confirmed to us by the discovery of tiles, that although displaced coincide perfectly with the entirety that we reproduce. In the last tile pavement many bits of terra cotta imitate a veined green marble. [1] Evidently the artists of the 12 th century were permeated by antique traditions, and some sought to render the effect of the Roman mosaics of the late time, of which they possessed numerous examples; having no m marbles at their command, they imitated them by means of the glazing with which they covered their tiles.

Note 1. p. 263. These pieces are rendered by irregular work.

We have also found in Germany combinations of tiles of terra cotta in color forming designs varied in outline and assemblage. These tiles date from the first years of the 13 th century; it should not be forgotten that the arts of Germany were then fifty years behind the arts of France. We think that it will be useful to present here some of these examples, that besides very evidently belong to the style of the 12 th century, and that so much as these tiles came from the vicinity of Dresden, and that these countries then received all the a arts of the West. These fragments (Figs. 5, 5 bis) are now deposited in the Museum of the Great Garden at Dresden, and belong to the cloister of Zelle, situated about 50 miles from that city. Figs. A and B show how these tiles are made and

cotta tiles. Indeed everywhere could be made bricks, and nothing is easier than to give them varied tints by a covered burning. It is probable that from the Carlovingian epoch floors of colored bricks were in use; one could thus at little cost obtain pavements presenting nearly the appearance of mosaics. Yet we must state that we know of no pavement of terra cotta before the 12 th century; one should not be surprised, when he observes how little durable are the glazes for coating that material; quickly worm off, pavements of terra cotta must be frequently replaced.

The oldest pavements known to us are those, that we discovered some years since in the apsidal chapels of the abbey church of S. Denis; these pavements are of the time of Suger; they were mostly left in place, probably because of their beauty, when in the reign of S. Louis, these chapels were restored. They are in great part composed of very small bits of terra cotta glazed black, yellow, dark green and red, cut in triangles, squares, lozenges, parts of circles, polygons, etc.; they form in their assemblage actual mosaics of charming design. The pavement of the chapel of the Virgin, published in the Annales archeologiques of M. Didron and in the Encyclopedie d'Arhhitecture by M. Bance, that of the chapel of S. Cucuphas, likewise reproduced in the latter work and in the Etudes sur les carrelages historiés of M. Alfred Rome and now restored, are two very beautiful specimens of mosaic pavements of the 12 th century. We believe it useless to reproduce here t the whole of these pavements, and shall limit ourselves to g giving fragments, to show the method followed by the architects of that time. These pavements are generally composed of bands forming varied designs separated by narrow borders . The influence of antique mosaics makes itself felt again in t these combinations, for each tile carries its color, and by their assemblage is produced the designs. The brickmakers of the 12 th century had carried very far the art of moulding these little bits of clay, and the frequently composed very complex designs and even ornaments by the intersection of curves with each other. For example, here (Fig. 1) a fragment of the pavement of the chapel of the Virgin of the church S. Denis shows us bands formed of black and red circles that intersect, and very small compartments composed of triangular and

seen on the exterior of the choir of church S. Remy of Rheims, whose construction dates in the last years of the 12 th century. But it should not be forgotten, that at Rome exist numerous fragments of Roman antiquities, and that the sight of these monuments had an influence on the architecture and sculpture of that part of Champagne.

Flutes reappeared on pilasters and columns at the moment of the Renaissance; frequently then as on the facade of the Louvre next the river, or as on the ground story of the gallery of Philibert Delorme at the palace of the Tuileries, they alternate with courses having bosses.

CANTON. Canton. Division of a shield.

A term of heraldry. Cantoned in architecture is said of piers whose four faces are strengthened by engaged columns or pilasters; men then say a pier cantoned with four columns or four pilasters. (Art. Pilier).

CARREAU. Square. Tile.

The name given to slabs of stone, marble or terra cotta, t that serve for paving the interiors of edifices. (Art. Carrelage). By facings are also designated the stone slabs of small thickness, that form the surfaces of a wall. A wall is built of squares or slabs and headers. (Art. Boutisse).

CARRELAGE. Pavement. Tile Floor.

An assemblage of slabs of stone, marble or terra cotta. The Romans usually covered the floors of rooms in the ground story with mosaics composed of small cubes of marble of different colors, forming colored designs by their arrangement, ornaments and even figures. They also frequently employed large slabs of marble or stone, square, oblong, polygonal and circular, to pave halls for receiving a great assemblage of people; for mosaic could not last long under the feet of the multitude. Bricks were reserved for the most ordinary paving. During the first centuries of the middle ages in France, these traditions were retained; but marbles in the North were not common, aud the making of mosaic was expensive; it was but rarely employed for pavements (Art. Mosaique); men preferred stone pavements carved and inlaid with colored cements, or glazed terra c

Doric, Ionic and Corinthian orders; the Romans likewise employed them; thus we seen in France flutes applied on columns and pilasters of the Romanesque epoch in the provinces in which Roman architecture had left numerous vestiges. In Provence, along the Rhine and the Saone, and even in Burgundy, flutes are sometimes cut on columns during the 12 th century, but m more particularly on the faces of pilasters. Then occurred a sort of Renaissance, that in those provinces covered by antique fragments, led architects to imitate Roman sculpture, that the Romanesque filiation had gradually debased. This return to the details of antique sculpture is very apparent on the portal of the church S. Gilles, in the cloister of S. Trophime at Arles, at Thor, Pernes, Cavaillon in Provence, in all the churches bordering the Rhone; then farther North, at Langres, Autun, Beaune, Semur in Brionnais, Charite-sur-Loire and Cluny. In the architecture of those countries, the pilaster is preferred to the engaged column, and the pilaster is always fluted; it must be said, that its flutes have a more beautiful section than the Roman flutes, too lean and too deep, badly terminated at top by a semicircle, with soft form, confused near the base, when cabled. The western flutes of the 12 th century approach the sections and scale of Greek flutes, like many other profiles of the same epoch.

We give (Fig. 1) one of the pilasters of the triforium of t the cathedral of Langres, whose face presents a single flute; and (Fig. 2) one of the great pilasters of the internal piers of the same church, whose face is ornamented by two flutes. Between the flutes are carved rounds; the entirety of these a alternating concave and convex rurfaces produces much effect. At the cathedral of Autun, whose construction precedes by some years the erection of that of Langres, the flutes of the pilasters approach more the Roman flutes. (3).

When the flutes are cut on columns in the 12 th century, t they are rarely simple; they have chevrons or zigzags, cables, are broken or filled by ornaments (Art. Colonne); such are t the flutes of one of the columns of the principal doorway of the cathedral of Autun (Fig. 4); it is only in Provence that one finds columns simply fluted. In the 13 th century flutes disappeared when pointed architecture was adopted.

One of the last examples of flutes applied to columns is

of the Passion, commencing with that of the garden of olives and ending with the crucifixion. From the 16 th century, these grouped representations are replaced by the stations erected at certain distances in the open air on the slopes of a hill, carved or painted in frames attached to the piers of churches.[1]

Note 1. p. 256. The idea of representing to the faithful the 14 stations of our Lord, from the moment that he was delivered to his death by Judas, is certainly of a nature to inspire the strongest feelings; the view of sufferings borne with patience by the Son of God is very suitable for strengthening afflicted souls; this in our opinion is not the most touching sight in our churches, the sight of women silently coming to kneel before the terrible scenes of the Passion, then following them one by one to the last. Why is it necessary that these respectful prayers (for they are neither inspired by ambitious desires nor by indiscreet wishes, but by sorrow and the need of consolation) should be addressed to God before images almost always hideous or ridiculous, that dishonor our churches? These paintings at the stations are made in the lump at fixed prices, paid for by the yard or according to the more or less color with which they are daubed; they come from the same workshop, from which are sent to the provinces the immodest paintings over fireplaces, drinking scenes for taverns, and it must be said from the point of view of art, that these paintings have not even the merit of the commonest wall papers. It seems to us that the figures, which should find places in our churches, even of the humblest kind, should be subject to a severe control by the enlightened members of the higher clergy; that t they should be perfect is difficult; but it is at least essential, that they should never be ridiculous or repulsive; that as art they should not be below what one sees in barrooms. If not, better is a simple inscription; however poor is the imagination of whoever prays, it will depict for him the scenes of the Passion in a manner more noble and more worthy than t these grotesque paintings.

CANNELURE. Flutes.

This is a moulding in the form of a small hollow cut vertically on the surfaces of columns, or on the faces of pilasters. The Greeks had adopted flutes on the shafts of columns of the

frequently occurred, that to give more magnificence to the f fronts, the visible pipes were decorated and gilded, enhanced by black or colored bands, the woodwork itself was painted a and gilded; such is the case of the great organ of the cathedral of Strasburg. Nearly all the old organ cases, like that of the cathedral of Perpignan, were closed by painted shutters, that the organist opened when he played the organ.

BUIZE. Canal. Duct.

An old word still employed in Picardy, and that signifies a canal or duct for water. (Art. Tuyau de descente).

BYZANTIN. (Style). Byzantine.

BYZANTINE. (Architecture). (Art. Architecture).

CABARET. Barroom.

An old word meaning a place enclosed by bars, from which c comes the name of cabaret given to the shops of retailers of wine.

CAGE. Stairway. Stair Hall.

Signifies the space within which is placed a stairs. (Art. Escalier).

CAMINADE. Room with Fireplace.

An old word employed for a warmed room, one in which is a fireplace.

CALVAIRE. Calvary.

It was usual during the 15 th and 16 th centuries to represent the scenes of the Passion of Jesus Christ in cloisters, cemeteries, or even in a chapel attached to a church, by means of complete figures carved in stone or wood, either arranged in a vast frame or on a sort of platform rising in steps to a summit on which rose the three crosses bearing our Lord and the two thieves. A great number of these monuments are still seen, that date from the 15 th and 16 th centuries, in the cemeteries of Brittany. Many reredoses of wood from the beginning of the 16 th century likewise represent all the scenes

The organ case of the cathedral of Perpignan is well executed in fine oak, and its construction as to be seen, is arranged in a single plane, is very simple; it is only composed of stiles and rails with open panels. Nearly all the front pipes are utilized. The organist is placed at the middle behind the balustrade, and plays on the keyboards arranged in the lower recess; the bellows is placed behind in a recess.

Note 1. p. 253. The organ of Solies-Ville is very small. I Its front is only 8.2 x 8.5 ft. in height; this is dated in 1499. We prefer to give our readers the front of the organ in Perigueux, which is larger and more beautiful in work and design, and that dates from the same epoch. Besides and in spite of the attention of archaeologists fixed on the organs of Solies (Vol. 3 of Bull. Archaeol, pub. by Minister of Public Instruction, p. 178), the instrument has been taken from the case and repaired by a Pole. The curious inscription carved on the base of the front has been removed, and the present p priest of Solies thinks of making a confessional of this empty case.

Men go to see (Fig. 2) the case and organ gallery of the c church of Hombleux (Picardy), that dates from the beginning of the 16 th century. Here the instrument is supported by corbelling, the lower part having scarcely the width necessary for the keyboards and registers. This arrangement permitted musicians, players on instruments and singers to place themselves in the gallery around the organist, seated in the little seat placed on a bracket, and in this respect it merits mention. Otherwise the same system of joinery as at Perpignan and Solies. The pipes determine the form of the woodwork, that l leaves them visible for their entire height and according to their varied lengths. We shall also cite the organ galleries of the cathedral of Strasburg, the churches of Gonesse, Moret near Fontainebleau, Clamecy, S. Bertrand of Comminges, cathedral of Chartres, that date from the end of the 15 th century and the 16 th. The woodwork of all these organ cases is subject to the instrument and only covers it, the open panels only fill the voids existing between the upper extremity of the p pipes and the ceilings, so as to allow the escape of the sound; as for the mechanism and the wind duct, they are entirely enclosed between the solid panels of the substructure. It freq-

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Note 1. p. 252. Report by Felix Clement to Minister of Public Instruction and Worship on the organ of Toulouse. 1849.

"The church S. Severin," says abbe Lebeuf,[2] is one of the first in Paris where organs have been seen; it was there from the reign of king John, but was a small case; as the church was then neither so long nor wide. I have read an extract from the manuscript necrology of this church, that in the year 1358 on Monday after Ascension, master Reynaud of Douy, scholar in theology at Paris and governor of the great schools of the parish of S. Severin, gave the church a good and well arranged organ. That was seen to remain until in 1747, placed against the tower of the church, havind been built in 1512."

Note 2. p. 252. Hist. d.l.ville e.d.diocese d.Paris. Vol. 1. p. 168.

In the 15 th century are first mentioned organs of 16 and even of 32 ft.; the cases from that epoch must then have monumental dimensions.

In the 16 th century, all the stops of the modern organ were in use and formed an entirety of 1500 to 2000 pipes. The organ that passes for the oldest in France is that of Solies-Ville in Var. [1] That of Perpignan dates from the first years of the 16 th century; we give here (1) its front. The case is closed by two great shutters covered by paintings representing the adoration of the Magi, the baptism of our Lord and the four evangelists. A choir organ placed at the end of the 16 th century disfigures the lower part of the front; the drawing given by us assumes this to be removed. The choir organ is further not indispensable in the great organs. When the maker can arrange his mechanism on a gallery sufficiently spacious to place his sound boards in the principal body of the case, the choir organ is merely a decoration concealing the organist f from the eyes of the multitude. A keyboard on consoles is preferable, for it is necessary for the artist to see what passes in the choir. Yet it is probable that the old makers found it more convenient to place the sound board of the choir organ at a certain distance from the keyboards, because of the small width of the mechanism, while in placing their sound boards in the interior of the great case, they were obliged to establish connection by pieces, registers, etc., whose length must produce irregularities in the transmission of the movements.

they contributed to the external ornamentation of palaces and gardens.

Note 2. p. 251. Some fragments of these glazed terra cottas from the chateau of Madrid are deposited in Cluny Museum.

BUFFET D'ORGUES. Organ Cases.

Thus are designated the cases of carpentry and joinery, that serve to enclose the organs of churches. Until the 15 th century, it does not appear that great organs were in use. Only instruments of small dimensions were used, that could be contained in furniture placed in choirs, on rood screens, or in galleries more or less large designed to contain not only the organs, but also singers and musicians. Only toward the end of the 15 th and beginning of the 16 th centuries, men had the idea of giving to organs dimensions unusual till then, having great power of sound and requiring colossal wooden enclosures. The oldest organ cases known to us do not date before the last years of the 15 th century; those organs are nothing beside the monster instruments made since the 17 th century. Yet from the 14 th century, certain organs already consisted of the s same elements as those of our days; superposed keyboards that could be connected, pipes of tin for show, three bellows, changes of stops, and what should be especially noted, these o organs had an organ placed behind the organist, in which were placed flutes, whose effect is mentioned as very agreeable.

M. Felix Clement, to whom we owe precious information on o old music and organs, informs us that he has found in the archives of Toulouse a very curious document on a gift to a confraternity of an organ and dated in 1463, made by Bernard de Rosergio, archbishop of Toulouse. It results from that paper that five organs were placed on the rood screen in the following order; a great organ rose in the middle, behind a little organ arranged as now is the choir organ; another organ of s small dimensions was placed on the top of the great organ case, surmounted by an angel, at the right and left of the rood screen were found two other organs, that two confraternities were authorized to use, while the use of the three former was exclusively reserved to the canons and the chapter of the cathedral. The five instruments could further sound together at t the desire of the archbishop. [1]

or flat alternately. (Art. Construction). Bricks were very f frequently employed in the middle ages for internal floors; they were then glazed on overlays of clay of various colors. (Art. Carrelage). In half timber structures of the North of France in the 15 th and 16 th centuries, bricks are utilized for filling between posts, girts and diagonals; and the manner in which they are set forms varied designs. In that case they are sometimes glazed. (Art. Pan de Bois).

We still find in Bourbonnais, at the chateau of Palisce, e even at moulins, structures built of bricks and mortar, that date from the 15 th century, and whose surfaces present (by the alternation of red and black bricks) varied designs, such as lozenges, zigzags, chevrons, etc. The manner in which these bricks are set merits the attention of constructors; the mortar beds and joints have a thickness equal to that of the bricks, i.e., 1.34 ins. These bricks present on the exterior t their ends, that are only 4.7 ins. and their lengths of 9.4 ins. bond in the wall. Fig. 1. shows how these brick surfaces are set. [1]

Note 1. p. 251. M. Millet, architect, to whom we owe these data on bricks of Bourbonnais, recognizes that brickwork with thick beds of mortar has extraordinary strength; this should be so. Bricks being very rough and porous, absorb a great quantity of water; when separated by thin beds of mortar, they soon dry these, and it is unnecessary to recall that mortars must contain permanently a very notable quantity of water to retain their strength.

During the Renaissance, structures of mixed stone and brick enjoyed great favor; thus were obtained at small cost surfaces varied in color, where the eye readily distinguishes the solid portions of the building from the fillings. The examples of this sort of constructions abound. It suffices to cite the w wing of Louis XII of the chateau of Blois, certain parts of the chateau of Fontainebleau, and the celebrated chateau of Madrid built near Paris by Francis I, where glazed terra cotta was combined with stone, presenting on the exterior an unchangeable and splendid coloring. [2] Everyone knows that Bernard de Palissy knew how to make glazed terra cotta. In his time the numerous products of his furnaces served not only to decorate the dressing tables of rich citizens and nobles, but t

BRIQUE. Brick.

By this word ase designated blocks of earth, beaten, moulded, dried in the sun and burned in an oven. The use of bricks dates back to the highest antiquity. The Romans made great ase of them, particularly in countries where stone is not common. During the late empire, they frequently constructed masonry by means of rubble faced with small cut stones alternating with courses of bricks set flat. Gallo-Roman and Merovingian structures still retained that method. But after the 9 th century, one very rarely finds bricks combined with other materials; bricks are used only where employed alone. We must always except certain structures in the South of France, where bricks are reserved for fillings, vaults, plain surfaces, and stone for the angles, sills of windows, arches, belts and cornices. Thus bricks were employed in the 12 th century in the construction of church S. Sernin of Toulouse. That part of L Languedoc being nearly the only province of France in which stone is entirely wanting, the architects of the 13 th and 14 th centuries frankly adopted the method of erecting their edifices in brick, employing stone only for tracery of windows, columns and some isolated supports of small diameters.

One of the most beautiful examples of mediaeval construction in brick is certainly the old monastery of the Jacobins of T Toulouse, which dates from the end of the 13 th century. Later in the 14 th centure, we see built in brick the pretty fortified church of Simorre, the college S. Remond and the walls of Toulouse, houses of the same city, the bridge of Montauban; later still the cathedral of Alby, a great number of private houses of that city, the churches of Moissac, Lombez, the tower of Caussade, etc. The bricks used in that part of France during the 13 th, 14 th and 15 th centuries are large and almost square, usually 11.0 × 10.0 ins and 2.4 ins. thick. Frequently the mortar joints between them are 1.6 to 2.0 ins. t thick. Moulded bricks are rarely used in France during the m middle ages, while common in Italy and Germany; yet one sometimes finds little modillions in the cornices and simple mouldings, such as coves and quarter rounds. Bricks of Languedoc being very soft, builders preferred to cut them; or rather t they produced an ornamentation by setting them diagonally under cornices so as to make the corners project, on end or edge,

From the 14 th century, projecting bays were not alone works of military architecture; city houses were furnished on the front next the public place with a bay of wood or masonry, a sort of balcony, from which cries were made, or public acts were read, proclamations and judicial condemnations. Men said to bay instead of to proclaim. Still to be seen at the city hall of Arras are the remains of a covered bay, set on a corbelling at the middle of the facade. The projecting bay of t the city hall of Luxeil is still entire. That arrangement was adopted on all municipal edifices in Europe. In Italy there are loggias raised above the ground by a flight of steps, like the palace of Siena, or upper porticos or balconies, as at t the palace of the doges of Venice. In Germany not only public edifices are furnished with projecting bans, but palaces and private houses nearly always have a bay in several stories, a sort of projecting half tower frequently placed over the doorway. At Nuremberg, Innsbruck, Augsburg, Prague, houses of the 14 th, 15 th and 16 th centuries all have one or more closed projecting bays on their facades, which permit seeind under cover everything occurring from one end to the other of the street. In France the bays more especially take the form of turrets (Art. Tourelles), and are then placed preferable at the corners of the houses. One may regard as actual bays the little two-story balconies, that flank the external facade of the chateau of Blois. (Wing of Francis I).

BRETTURE. Tooth Axe.

A stonecutter's tool made in form of the cutting axe and t toothed. (1). Mediaeval stonecutters commenced to use the tooth axe for dressing surfaces about the middle of the 12 th century. Until then the surfaces were dressed with the axe or chisel without teeth. The tooth axe ceased to be employed in the 16 th century for cutting visible suffaces. It had broad teeth at the beginning, i.e., about the end of the 12 th century and the beginniug of the 13 th. (2). The teeth became c closer at the end of the 13 th and very close in the 14 th. (3). (Art. Taille). The style of cutting mouldings and surfaces is then one of the means of recognizing the date of construction of edifices.

BRIQUE. Brick.

When was to be defended a breach made by the besieger, there was established as quickly as possible within the city a palisade behind that breach, and this palisade was strengthened by one or more turrets. (Art. Architecture militaire, Fig. 10). These works were also established to protect a passage or bridge-head. [4]

Note 4. Chron. de B. Duguesclin. Verse 19525 et seq.

Projecting bays were added to permanent defenses of masonry, either in fixed carpentry or temporary wooden projections, t that permitted striking the foot of these defenses, passages or gates. In this case what distinguishes the projecting bay from the covered gallery is that the latter is continuous and crowns a wall or tower, while the projecting bay is a separate shed attached to the edifice, closed on three sides, with battlements, covered and pierced by machicolations.

Here is a city gate (1) surmounted by a projecting bay [1] p placed in hime of war, that could be removed. We know some v very rare examples of projecting bays still existing, and placed at the level of the roofs of towers, connected with their carpentry and intended to flank their fronts; among these we cite those of the tower of Deniers at Strasburg, which are v very beautiful and appear to belong to the last years of the 14 th century. (2). These works of carpentry project sufficiently from the fronts of the masonry to open large machicolations and wide battlements, that are still equipped with their shutters. Their bases are covered by tiles an scale pattern, and their roofs by hollow tiles set in mortar. The kingposts have retained their leadwork and rods with weathervanes.

Note 1. p. 246. Manuscript of Froissart, 15 th century; Impl. Liby. "This speaks of the battle at Meaux in Brie, where the Jacques (rebels) were defeated by count de Foix and Captal de Beus, and is of the 25 th chapter.

Wooden projecting bays were also placed on civil edifices, not especially intended for defense, such are the two bays still preserved on the angles of the custom house at Constance, (Fig. 3) above covered galliers also of wood. This building was erected in 1388, and these works in carpentry date from the primitive construction; the bays are set diagonally to p protect the angles, two triangular machicolations increasing those of the galleries.

fortification, leaving between the foot of the walls and the ditch a passage more or less wide serving as a covered way, and intended to prevent the assailant from using miners. This was most frequently a palisaded work streagthened at distances by towers suitable to protect sentinels. When artillery was employed for the attack of strong places, men built around c curtains, ramparts or bastions, low walls with parapets at t the level of the counterscarps of the ditches in order to place arquebus men there. These defenses were known as false o outworks, and had the advantage of presenting a front of musketeers before and below guns placed on the ramparts, and to obstruct approaches; they must be renounced when siege artillery had acquired great power, for then the parapets of the false outworks being destroyed, these formed a terrace that facilitated assault.

BRETECHE. Projecting Bay. Gallery.

This term designated in the middle ages a wooden work in s several stories with battlements, employed for attacking or defending a strong place. When for the attack it differed from the tower in being fixed, while the tower was movable.(Art. B Beffroi). This is frequently confounded with the bastile; the name of projecting bay appears to be oldest. It was used in the 11 th century for fortifying, furnished with battlements of wood or covered galleries. (Art. Hourd). Old French poem in text. [1]

These were often works in the country built in haste.

Note 1. p. 244. Roman de Rose. Part 1. Verse 4059 et seq.

They could be taken apart and transported from one place to another as needed. William of Normandy desired to fortify Ambrieres on the Mayenne after getting possession of Domfront.[1,2.]

Note 1. p. 245. Roman de Rose. Part 2. Verse 9444 et seq.

Note 2. p. 245. Roman de Rose. Part 2. Verse 9625 et seq.

The duke undertook to defend a castle or rather a post by means of prejecting bays hauled from Domfront to Ambrieres. Much later the king of England, who could only conquer the city of Calais by famine, caused to be built a great and high castle of long timbers, so strong and well protected by bays, that it could not be injured. [3]

Note 3. p. 245. Froissart. Chapter 144.

architectural decoration during the 12 th and the beginning of the 13 th centuries. It is intended to decorate the hollow separating astragals or rounds in the bands of arches; the b buds are connected like the seeds of a chaplet, or are spaced, plain or ornamented. If plain they take the form indicated in Fig. 1; ornamented, they are opened in 3, 4 or 5 leaves.(2).

In the monuments of Poitou erected in the 12 th century, o one frequently meets with buttons divided at the sides like the pistils of certain flowers.(3). [1] This sort of button is frequent in the decoration of archivolts of the Norman edifices of the 12 th century. (4). [2]

Note 1. p. 242. From the church of Surgere.

Note 2. p. 242. From the tower of S. Romain, cathedral of Rouen.

The rose windows opening over the triforium of the cathedral of Paris, before the piercing of the great windows of the 13 th century, were decorated by buttons near together, and cut in form of a little breast and nipple with a hole at centre. (5). [3] The rich arches of the great external gallery, that s surrounds the towers of the same cathedral, have their hollows decorated by great trefoil buds, that produce a very beautiful effect by casting lights and shadows in the middle of the concentric curves, thus breaking their monotony. (6). The buds disappear from the ornamental sculpture of edifices during t the 13 th century; then it was only desired to imitate the flowers or expanded leaves. (Art. Flore).

Note 3. p. 242. This singular ornamentation is now seen on those windows from the end of the 12 th century, that have b been replaced below the high windows in the transepts.

By button is designated a knob of iron or bronze fixed on the leaves of doors, serving to draw them for closing. During the middle ages the leaves of doors were rather furnished with rings than knobs; yet toward the end of the 15 th century, t the use of knobs on doors is not rare; they are generally composed of a mushroom of wrought iron, on its disk being placed sheet iron plates with cut edges, forming by superposition d designs in relief in several planes.

BRAIE. Outwork.

An elevated defensive work before the front of a fortifica-

As everyone knows, the trade guilds were subject to special regulations. A master maker of kneading troughs, shields, pots, gloves, etc., could have only a certain number of apprentices at a time, and must keep them in apprenticeship only a certain time; the shop designed to contain the workmen of each master then always remained the same and did not need extension. Men did not know in the middle ages what we now term piece-work, a workman in his own room, sad innovations that have contributed to demoralize the artizan, to degrade his work, and to break the intimate and almost family relations, that existed between the workman and the master. Customs impress their qualities and defects on domestic architecture, more than on r religious monuments or public edifices. The shops of the middle ages reflect the close but wise organization, prudent and paternal, that regulated the trade guilds. It was not possible to see then the stores of dealers , that occupy vast areas one day, then suddenly disappear, leaving a long list of bad debts at the place, and defective or falsified goods in an e entire city. We do not have to discuss in this work those matters foreign to our subject; we would only emphasize in a few words the character of the old shops of our commercial cities, so that in passing one does not cast a too scornful look at those little shop fronts, that however narrow and simple they may be, have sheltered patient and laborious fortunes, have seen the prosperity of the middle classes grow and develop.

BOUTISSE. Through Stone. Bond Stone.

By this word is understood a cut stone, that at certain distances extends through the entire thickness of a wall, and c connects the external and internal faces. When a wall is not solely composed of bond stones (i.e., all extending the entire thickness of the wall), whether because materials of sufficient size are not at command, or for economy, one builds by m means of rectangular blocks of stone connected at certain distances by bond stones; it is then said to be a wall built with bond stones. The stone A is a bond stone. (Art. Construction).

BOUTON. Bud. Button. Ball.

By this word is designated a sculptured ornament representing the bud of a flower. The bud was frequently employed in

shutters raised and lowered like those represented in Fig. 1, or by leaves of joinery folding on each other. (Fig. 4).

In some cities of Flanders, the shops were sometimes located underground; it was necessary to descend several steps to enter these, and these steps even infringed on the public street. The stairs were bordered by benches on which were placed samples of the goods; a hood protected the descent and the benches from rain. It is well to state that in the commercial cities, shopkeepers sought to obstruct the public way, to stop the passer by placing an obstacle to passage. That custom or rather abuse was continued a long time; only the establishment of sidewalks and regulations for the streets rigorously enforced with great difficulty could make these disappear. Commercial streets during the middle ages with their open shops,and their stalls projecting into the public way resembled bazaars. Then the street became like the property of the merchant, and passers had difficulty in finding openings for themselves during the hours of sale; as for horses and carriages, they had to renounce passing in the middle of the narrow streets encumbered by stalls and purchasers. During the hours of meals, b business was suspended; a good number of shops were closed. When the curfew sounded and the day ended, these streets became silent and almost deserted.

Some little cities of Brittany, England and Belgium may give yet an idea of these contrasts in the customs od the mediaeval merchants. On the little lowered shutters presenting an area of 43 or 54 sq. ft. were made substantial fortunes. The sons remained merchants like their fathers, and continued to retain those modest fronts, known to an entire city. A merchant would have lost his patrons, had he replaced the old grilles and the old shutters of his shop, changed his sign, or displayed a l luxury, that would have aroused distrust. We are very far from those customs. The shops, particularly in the cities of the North, were better known by their signs than by the names of the merchants,that possessed them from father to son. Men went to purchase cloth at the sow that spins, and the sow that spins maintained her good reputation intact for centuries. Many of these signs were merely puns; and a good number of streets in even the great cities took their names from the signs of certain celebrated shops.

on the coast of the Manche, however it appears that the ordinary obscurity of the sky compelled the merchants to open more the fronts of the shops on the street. At Dol in Brittany there still exist a certain number of houses of the 13 th and 14 th centuries, whose shops consist of granite columns supporting wooden beams (2) as today; and although the primitive fronts may have been replaced by recent enclosures, it is not doubtful that originally these great rectangular openings were not intended to receive woodwork set behind the pillars. In southern cities projecting stone corbels supported hoods of wood or tiles set before the opening of the arches. (Art. Auvent).

Already in the 15 th century, merchants required wider openings on the street; shops opening by arches, semicircular, p pointed or depressed, did not allow them to make such extensive exhibits. Civil constructors sought by new combinations to satisfy this imperative need; but that was difficult to accomplish with stone without the aid of wood and iron, particularly when limited by the height of the ground story, that rarely exceeded 10 or 13 ft., and when it was necessary to erect several stories above this ground story.

Here is an example of one of those attempts (3). This is a shop of one of the houses of S. Antonin; its opening is not less than 23 ft.; its construction dates back to the 15 th century. The segmental arch, obtained by means of four centres is doubled at the springing, and is single toward the keystone, which is supported by a column. Although this arch supports two stories and a roof, it is not deformed; its sections are executed with great perfection, and the stone is of a very hard nature.

But in the 15 th century, especially in the cities of the North, wooden structures were almost exclusively adopted for the houses of merchants, and this method allowed opening widely the shops on the street by means of posts and beams, whose spans were relieved by ties or X-braces placed above them in the half timber work. The cities of Rouen, Chartres, Rheims, Beauvais have retained some of these wooden houses with shops. Fig. 4 gives on of these shops completed by means of data taken from several houses of cities named above. (Art. Maison). The fronts of the shops of the 15 th century were still closed by

and keys, as still practised in our days. Above the lintel a and under the arch remained a glazed transom with a grille to give light in the room. Nearly all purchases were made in the street before the window sill of the shop, the buyer remaining outside and the merchant being inside. The shop was a storeroom entered only when one had business. This custom and the narrowness of the streets explains why in the regulations of Etienne Boileau, it is often forbidden to the merchants to call the purchaser to them before he has left the stall of a neighbor. Besides, during the middle ages and until the end of the 17 th century, merchants and workmen of the same guild were placed very near each other, and sometimes occupied both sides of the same street; hence the names of Rue de la Tixanderie, de la Mortellerie, where were established masons, de la Charonneriere, where dwelt carpenters, de la Huchette, de la Tannerie, etc., that we find in nearly all old cities of the middle ages.

On Saturday nearly all retail commerce ceased in all quarters to assemble at the market halls (Art. Halle). Newspapers, posters and means of advertising being absent, merchants caused to be cried through the city the merchandize they had just received. In Paris a guild of criers was established for that purpose; this guild depended on the provost, aud public authority allowed the criers to collect the imposts, particularly from vintners and innkeepers, who were obliged to have a public crier, at the same time required to ascertain the quantity of wine sold daily in each tavern. The king S. Louis having forbidden the sale of wine in taverns, the criers of wine became sellers, i.e., they remained in the street with a jug in one hand and a cup in the other, and sold wine to passers on account of the innkeeper. [1]

Note 1. p. 236. See Introd. au Livre des Metiers. of Etienne Boileau, by G. P. Dopping. Coll. of unpub. docs. on hist. of France. Paris. 1887.

One still meets with many shops of the 12 th, 13 th and 14 th centuries at Cluny, Cordes, S. Yriex, Perigueux, Alby, S. Antonin, Montferrand near Clermont, Riom, and in cities farther north, such as Rheims, Beauvais, Chartres, etc. The arrangement indicated in Fig. 1 was likewise adopted at Paris, so far as one can judge from old engravings. In some cities

timbers to be pressed against each other as done today by means of nuts. The modern bolt is an actual improvement; it permits assembling the parts of carpentry with ease, economy and accuracy. In our opinion it is abused like any invention convenient and economical in use; men have come to count too much on the strength of bolts and nuts, to neglect the joints and those wooden keys, that with great elasticity had the advantage of not injuring the wood by holes and iron bolts, that frequently cause it to split. Bolts now have square heads so that when set in the wood, they cannot turn when the nut is screwed up. Formerly the heads of bolts were generally round like the heads of nails.

BOUTIQUE. Shop. Store.

A room opening on the street and on the ground floor in which merchants display their goods for sale. It is unnecessary to say that the use of shops belongs to all countries, all e epochs and all civilizations. In Greek and Roman antiquity, shops occupied the ground story of houses in cities; it was the same in France during the middle ages. These shops were ordinarily composed of a room opening on the street by a great arch occupying the entire breadth of the room, with a window sill for supporting the goods. This window sill was interrupted at one side to leave a passage. A rear storeroom (workshop) was often annexed to the shop; the workmen and apprentices l labored either in the workshop or in the shop itself; also s sometimes a private stairway ascended into the second story and descended below into a cellar. Old examples of shops are not rare, and a great number may be cited belonging to the 12 th, 13 th and 14 th centuries. Until the end of that century shops were rarely enclosed by a glass front. The shutters being opened, the merchant was in direct communication with the street. The most common enclosure during the period just indicated was composed of lower and upper shutters, the former attached to the sill, lowered outwards to form a wide table for exhibiting goods, the latter attached to a wooden lintel and rising like the cover of a snuffbok. Fig 1 explains this sort of enclosure. At night the lower shutters being raised and the upper ones lowered, two iron bars were placed in brackets attached to the posts, and held the leaves held by bolts

safeguard for commerce; because the monasteries retained a right of control of the articles brought to the fair, and did not permit placing on sale goods of bad quality, that would have gradually discredited the commercial centre; as for the merchandize or products leaving their hands, they were interested and strongly adhered to maintaining their superiority over all others. The timber, grains, wines, furs and wool leaving the religious establishments were always of superior q quality, sought for and bought with confidence; for the monastery was not a passing manufacturer or farmer, who sought to gain the most possible during his life and leaving after him a discredited establishment; on the contrary it was a perpetual centre of products, laboring more to preserve its reputation of superiority, and consequently an assured sale forever, than to obtain an exaggerated and accidental gain by delivering falsified products or those of poor quality, to its future d detriment. The religious establishments at the end of the last (18 th) century were no longer what the 11 th and 12 th centuries had made them; and still that epoch is not sufficiently distant from us, for us to have forgotten the merited reputation still enjoyed by the wines, for example, of the great m monasteries during the last years of their existence.

If cities like Amsterdam, Antwerp, London, that were and are merely great emporiums, there was need of exchanges to establish the daily value of the products received and exported, it was not the same in France, a country rather agricultural than industrial and commercial, which consumes itself the greatest part of its products.

BOULON. Bolt. Keyed Bolt.

This name is given to a round iron rod with a head at one e end and a screw and nut at the other. Bolts are commonly employed now in carpentry and metal work. Before the 17 th century they did not hawe a thread with nut and wrench for tightening, but simply a key passing through the end opposite the head as seen here. (1). Further old carpentry works are only held together by the connections, wooden keys, and not by metal. Yet sometimes plates and girders are sometimes held together by iron spikes or bolts with keys, like that represented here. But this sort of bolts did not permit the wooden tim-

being almost always fixed for some other fair; for commerce during the middle ages had no middlemen between the manufacturer and the retailer. The Jews were then the only capitalists and carried on usury rather than banking. Such a state of things existed on the entire territory of France, and did not require in the great cities the establishment of a commercial forum, while the cities of the North from the 14 th century, cities mostly maritime or in direct communication with the sea, already had correspondents in foreign countries, also h had counting houses, and speculated by means of bills on the value of goods or products whose delivery was expected. In Fr France the merchant transacted his business himself, received and paid, and sold at retail without middlemen; a public place intended for the exchange of values was unnecessary to him; directly bargaining at the fairs with the manufacturer or traveling merchant, paying cash for the merchandise purchased, or bills for goods ordered for some other fair, he had relations only with the connection that he had made, and was ignorant of the modern mechanism of high finance, a mechanism by means of which the first comer, who has never sold a gramme of oil and will never sell one, can buy several tons of that merchandize, and without touching a barrel, make a profit of 10 per cent. The great peeiodical markets long preserved busines in France from what we term speculation, have contributed to preserve to it a reputation of traditional honesty, until the beginning of the (last) century.

We cannot give our readers an example of a mediaeval French exchange, as these establishments did not exist and had no reason to exist. We must state in honor of the monasteries (for it is always necessary to return to them, when one wishes to understand and explain mediaeval life in France), that these centres of the regular clergy were the first to establish fairs in the territ ry of France. Possessors of vast domains, of mills, agriculturists and manufacturers, they formed the nucleus of these periodical gatherings of merchants; certainly they derived a considerable profit from these assemblages, both by the sale of their products and goods, and by the use of the sites that they temporarily occupied; vast peaceful camps of which the fair of Beaucaire alone can give us an idea today. But this profit besides being very legitimate was a s

for two months, with orders to 16 district police officers to raise 16,000 laborers, and further to these suburbs to furnish as many more, or their houses should be destroyed. In 1544 F Francis I having learned that Charles V with his army was at Castle Thierry, immediately sent to Paris the duke of Guise, who protected by ramparts the walls of that city, as well on the side of the suburbs of the Temple, of Montmartre and S. Antoine, as those of S. Michel and S. Jacques."

Most of these works were not faced but simply turfed. The mounds yet to be seen between Rue Montmartre and Rue S. Fiacre, between Rue Poissoniere and Rue de Cluny, on the right of Rue de Bondy, in the boulevard of the Temple, the site where is now constructed the garden Beaumarchais, were as many ramparts outside the walls of Charles V.

BOURSE. Exchange. Bourse.

In the old French cities of the North, of Flanders and Holland, from the 14 th century commerce took such great importance, that the merchants established places designed for their daily gatherings in order to facilitate business. These b buildings, actual forums of merchants, were composed of vast porticos enclosing a court. Above the porticos were arranged covered galleries. A belfry with a clock, an indispensable a accessory of every municipal establishment was added to the buildings. France during the middle ages did not assume a sufficiently great commercial importance, or rather the merchants did not form a body homogeneous and compact enough to erect e exchanges. At Paris they assembled in halls or under the piers of the city hall. In the great cities of the South, which retained their municipal government in the midst of feudalism, like Toulouse for example, they bargained on the public place in the open air in business affairs. But in France, it was p particularly in great assemblages known under the name of fairs, that all transactions occurred in wholesale commerce; a and these fairs were established at certain fixed epochs of the year at several points of the territory, in the vicinity of great industrial or agricultural provinces. Thus not only were bought and sold products and goods brought to that place, but business affairs were arranged for a long term, important orders were given, the details of delivery and of payments

defended" is not still applied. It is scarcely until the middle of that century, that men began to protect places as much by tracing projtecting works, opening the angles of their fronts and flanks, as by the solidity of their construction.

It is curious to follow step by step all the attempts of t the architects and engineers of that epoch; as always the simplest arrangements are those finally adopted. The art of battering in breach making rapid progress, it was daily necessary to oppose new obstacles to the convergent fire of the besiegers. Military constructors were long occupied in covering their batteries, masking them until the moment of assault, r rather than in battering afar the vicinity of fortresses, and in opposing to an investing army a great number of cannon able to converge their shots on all points of the circumference. It was only when siege artillery was well mounted and numerous, its range had been perfected, and that ricochet batteries could reach masked defenses, that men felt the necessity of elongating the fronts of bulwarks and of replacing the orillons, that no longer contained guns intended to sweep the curtains, by extended flanks sweeping the fronts of the adjacent bulwarks. But then the bulwarks took the name of bastions. [1] The n name of boulevard was retained for promenades planted with t trees established on the old defensive works.

Note 1. p. 231. Art. Architecture Militaire. Among the works to be consulted are:-- (See list in text).

The great artery at Paris that encloses the right bank from the Madelaine to the Bastile left visible the trace of the old ramparts over which it passed. The leveling and alignment carried on for some twenty years have nearly destroyed these last vestiges of the defenses of the northern enclosure commenced in 1536 and successively extended until under Louis XIII. "At this time," says Sauval, " the enemies were so powerful in P Picardy, that the threatened no less than to come to take Paris; cardinal du Bellay, lieutenant general for the king both in the city and the entire Ile-de-France, was warned of it a and to better receive them, besides several ditches caused t the construction of the moats and ramparts from gate S. Honore to that of S. Antoine, and so that this work should proceed rapidly, the officers of the city being assembled on July 29, 1536, forbade to all artizans the exercise of their trades f

protecting their fronts by cross fires, by extending and masking their flanks to sweep the ditches, men still sought at t the end of the 16 th century to isolate them from the body of the place, in case they might fall into the power of the enemy. In the treatise on fortification of Girolamo Maggi and of Captain Jacomo Castrotto, engineer in the service of the king of France, [1] we see bulwarks very narrow at the gorge, thus e easily cut off; on the contrary others are very wide at the gorge but are casemated, and the lower gallery being destroyed by means of stoves forms a ditch between the bulwark and the body of the place. Here is the plan (13) of these works that merit mention. Girolamo Maggi states that a bulwark of this kind was built in 1550 near gate Liviana at Padua by Sanmichele of Verona. This bulwark was entirely isolated by a casemated lower gallery A at the level of the ditch, able at need to s serve as barracks of soldiers and stores. In the piers of this gallery were arranged recesses to receive stoves; if the fronts of the bulwark fell into the power of the enemy, fire was set in these stoves, and the advanced work found itself suddenly isolated from the curtains B by an impassable ditch. For the defense of the ditches cannon were placed at C at the two ends of the gallery and masked by the shoulders D. It must be admitted that works of this kind, built in great number around an important place, would have caused enormous expense, perhaps not in proportion to the advantages hoped from them; but until the beginning of the 17 th century, military engineers were s still impressed by the traditions of the middle ages, and as may be seen by the examples given above, did not fear to project and even execute works of fortification requiring a considerable mass of materials and expensive combinations in construction. The progress of artillery gradually compelled engineers to simplify the defensive obstacles of places, to give greater development to projecting works and to make them more substantial.

Note 1. p. 229. Della fort. d. citta, by M. Gir. Maggi & cap. Jacomo Castr. 1583. Venice.

Note 2. p. 229. Book II, po 59.

Bulwargs at the beginning of the 16 th century are only isolated fortifications defending themselves and badly protecting each other. The principle, "that what defends must be de-

placed over the ditch D (Figs. 8, 9), the curtains could command that advanced work and prevent the assailant from remaining there. [1]

Note 1. Albert Durer. pict. et arch. de struct. agg. Paris. 1535.

Whatever the extent of the semicircular bulwarks, their divergent fire badly flanked the curtains; one soon understands that it was necessary to defend the projecting bulwarks rather by the cross fire of the adjacent ramparts than by their own armament; that the assailant always tending to batter the projections, it was necessary to converge on the point attacked batteries taking the enemy in flank; they were rejected semicircular bulwarks to adopt fronts forming an angle, or that the upper circular batteries were strengthened by lower batteries with redoubts as at Augsburg. (Art. Architecture Militaire, Fig. 68). The general plan of the fortifications of t that city at the beginning of the 16 th century, that we give here (11), shows how men understood at that epoch to arrange bulwarks before the projecting angles of the old defenses, and how they sought then to make these bulwarks stronger by redoubts flanking their fronts.

But it is in France that we shall find bulwarks best conceived from the beginning of the 16 th century. There exists a plan (manuscript on vellum) of the city of Troyes, preserved in the archives of that city, that indicates in the most evident manner great bastions or bulwarks with orillons and fronts forming acute or obtuse angles, and this plan does not s seem later than 1530, for it was drawn at the time when Francis I had the fortifications of Troyes repaired in 1524. Here (12) is a copy of one of the works projected on this plan. The ditch is full of water, at A are seen small masked batteries in two stories, probably reserved below and behind covered f flanks B built behind the orillons. The batteries B sweep the fronts of the old remaining towers. One will note that the m masonry facing of the bulwark is thicker at the angle than at the shoulders, thus presenting its greatest resistance at the point where the breach must be made. Buttresses are also added under the terrace to support all these fronts. This work is entitled "Bulwark of the gate S. Jacques." "

While daily giving a greater extent to the bulwarks by pro-

the river. It is seen that the up-stream curtain N is flanked by a high square tower. We have restored the tower found at the bridge-head, now destroyed. There remain only some traces of the works that surrounded that tower. The old bridge has been replaced by a wooden bridge. As for the principal body of the fortress, curtains, ditches, etc., nothing has been removed or added since the 16 th century. The masonry is coarse but excellent, and has suffered no change. The vaults of the great hall are thick, well built, and seem to be in condition to resist bombs.

This defense of Schaffhausen has a great air of power, and we have retained nothing of that epoch in France, which may be as complete and as skilfully combined. For the time, the flankings are very good, and the plan of the ground story at the level of the bottom of the ditch is really traced in a r remarkable manner. If one finds here a remnant of the traditions of fortification before cannon, yet it must be said that the efforts made to become free of them are very apparent, a and the fortress of Schaffhausen appears to us superior to a analogous works executed at the same time in Italy.

In imitation of mediaeval towers, the circular form is preferred for the first ramparts as for the first bastions. Albert Durer traces semicircular ramparts with straight flanks before the projecting angles of the walls. He then composes them of a barbette battery sweeping the exterior, counterscarp and glacis, and a covered battery sweeping the ditches, as indicated by the plan (8), that we give after his work. The rampart of Albert Durer is separated from the curtain by a passage D D, a sort of ditch covered by a floor. Behind the rampart are established vast casemates E (9) at the level of the place, intended for barracks for the garrison and for a store of munitions.(See section A B of the plan, Fig. 8). The covered battery is furnished with large embrasures for cannon and other smaller ones for the arquebus men. Vents and flues are opened over each embrasure. The casemates E are lighted and ventilated by openings at the centre of each cross vault as at Schaffhausen. Contrary to the custom adopted till then, Albert Durer did not command the curtains by the bulwark; on the contrary as indicated by the external front (10), he seems to admit that the bulwark being taken, by destroying the floor

across the ditch; on this side the architect believed that he should strengthen his rampart by an enormour mass of solid m masonry, and with reason, the fortress only being battered in breach from the neighboring terraces at this point. At the right of the rampart, up stream on the river, at the side where an attack could also be attempted is a casemate battery F, s separated from the principal interior by thick masonry. A breach made at G could not permit the enemy to enter the place. At H is a vast hall, whose cross vaults are supported by four great cylindrical piers. Four embrasures open in that hall, two flanking the two curtains that descend to the river, and two opening on the triangle. Besides the vents pierced above each embrasure, in the vaults of the great hall open four lunettes M nearly 10 ft. diameter and intended to afford light and air, and to allow to escape rapidly the smoke from the powder. In I is a well and at K are two small screw stairs c communicating with the upper platform for the serwice of the garrison. Near the ramp is a third screw stair, that ascends from the bottom. We present here (5) one of the embrasures of the grea hall, ingeniously combined to allow the guns of small calibre to fiee in all directions without unmasking either the guns or the men. Fig. 6 gives the plan of the upper story or platform with parapet pierced by 10 embrasures for cannon and four turrets flanking the circumference of the fortress, pierced with plunging and horizontal slots for posting arquebus men. It is evident that the two first embrasures at right and left sweep the interior of the triangle and flank the tower of the ramp, which serves as a keep or watch-tower for the entire work. One finds on this plan the 4 great lunettes M, the well I and the little service stairs. The water runs from the platform by 10 gargoyles placed under the embrasures. At N.O (Fig. 4) are the two curtains, that extend to the river. That of N is up stream and more strongly defended that the other; beneath the arches that support the passage and the w wooden galleries, still in place today, are pierced embrasures to batter the slopes of the bank, on the side where the enemy must present himself, the other bank being protected by the w wall of the suburb of Schaffhausen. To properly comprehend t the entirety of that fine fortress, we give a view (7), taken within the triangle formed by the two curtains descending to

state, so much more that the left bank of the river within t the triangle is dominated by the hills on the right bank, that presented an insurmountable obstacle to the river. In case of invasion, the enemy could not fail to occupy the two sides of the triangle and to attempt the passage of the river, at the point where it forms a bend; thus it did not risk being taken in flank. This determined, the Swiss then established a bridge connecting the two banks of the Rhine and the two parts of t the city of Schaffhausen, and on the right bank they planted a great fortress at the summit of the hill commanding the river, connecting that citadel with the Rhine by two walls and towers. These two walls form a vast triangle, a sort of bridge-head commanded by the fortress. Here (1) is the general appearance of that fortification, which we must study in detail. The citadel, or rather the great rampart that crowns the hill, is in three stories of batteries, two covered and one open to the sky. The lower battery is placed a little above the bottom of the ditch, that is very deep' here is the plan (2). One r reaches the pentagonal passage A by a spiral ramp B with a g gentle inclination, permitting the cartage of cannon. At each angle of this passage with a width of about 6.6 ft. are pierced skew embrasures for artillery sweeping the ditch; before the sides of the polygon are erected three small detached works, a sort of bastions given in perspective. (3). Assuming that the besieger succeeded in destroying one of these bastions by means of breaching batteries planted on the counterscarp of the ditch (for the top of the bastions did not exceed the level of the crest of this counterscarp, and they are completely masked from the outside), he could not enter the place; not only are these bastions isolated and communicate only with the ditch, but they have embrasures for cannon at the gorge C, pierced in the passage (Fig. 2), and their destricutio only masked these embrasures. The bastions were entirely built of stone, and covered by domes with lanterns pierced by vents to allow the smoke from the guns to escape. The second story was reached by the same gentle spiral slope B, there supported by four columns rising from the bottom, and presents on the exterior a perfectly circular plan, the tower containing the ramp alone forming a projection from the building on the side next the river. At about the opposite point E is a movable bridge

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appear sufficiently accented, and to it was given a flat A. (5). [1]

Note 1. p. 219. Already in edifices of the 13 th century are found rounds cut according to the section given in Fig. 5.

On mullions, a round forms the principal rib of the combination of curves (Art. meneaux); in this case it merely continues the diameter of the little column. The round disappeared in the 15 th century and gave place to curved prismatil forms. (Art. Profil).

BOULEVARD. Bulwark. Rampart. Outwork. Promenade.

By this word about the end of the 15 th century and during the 16 th is designated an advanced fortification, that replaced the barbicans of the old fortresses. (Art. Architecture Militaire). The rampart appears at the same time as the regular place for artillery. It is at first built of turfed earth, and perhaps owes its name to its green external appearance; s soon from the temporary work built in haste outside the old walls, it passed to the state of a permanent terrace faced w with stone or a construction of thick masonry defended by ditches, covered and barbette batteries. The rampart became the principal defense of places; it protects the old walls, or indeed if placed at a weak point, it forms a considerable salient and is only connected to the entirety of the fortress by extended lines.

Among the exhibits made at the end of the 15 th century and the beginning of the 16 th to place the defense of places above the level of the attack, we should cite in the first line the fine fortress of Schaffhausen, an actual rampart, that p presents a group of works very remarkable for that epoch, and still perfectly complete today. But to make understood the importance of that work, it is necessary to give an account of its site. On leaving lake Constance, the Rhine passes by Stein toward the West, arrived at Schaffhausen it turns abruptly to the south as far as Kaiserstuhl. This bend is caused by high and rocky hills, that presented an obstacle to the river and compelled it to change its course. Stein, Schaffhausen and Kaiserstuhl form the three angles of an equilateral triangle of which Schaffhausen is the vertex. It was then of great importance to fortify this advanced point, the frontier of the

found on the surfaces of fortifications erected at the time of the regular use of artillery. They evidently represent balls.

During the development of the architecture of the Renaissance, the bosses are seen to be covered by various ornaments, such as vermiculations,(2), emblems, ciphers, network, etc. The ground story of the great gallery of the Louvre, from the pavilion of Apollo to the pavalion Lesdiguieres, furnishes numerous examples of this kind of decoration of bosses.

Note 2. p. 218. This sort of ornamentation is an imitation of the effects produced by salpetre on certain soft limestones, especially with a southern exposure. Stonecutters and quarriers still now attribute this singular effect of decomposition to the influence of the moon.

BOSSIL. Ridge.

An old word signifying a ridge at the middle of the ditch; also the ridge produced by the dirt from a trench thrown uphill.

BOUDIN. Large Half Round.

An architectural member of semi-cylindrical form, that decrates archivolts, transverse and diagonal arches, bands, etc. From the 9 th century the round appears on transverse arches to make them lighter. The crypt of the cathedral church of S. Etienne of Auxerre already presents great rounds or half cylinders projecting from a transverse arch with square angles. There are also seen in the crypt of the church S. Euthrope of Saintes (beginning of the 12 th century) transverse arches, that are merely great half rounds.(2). When the pointed vault was adopted during the 12 th century, the section of the transverse arches often remains rectangular, and the diagonal arches have one or three rounds. (3). 3 But rectangular sections were not retained long for transverse arches; from the middle of the 12 th century, we see half rounds replace square angles. (Arts. Arc-Doubleau, Arc.Ogive).

Note 3. p. 218. Porch of the abbey church of Vezelay.

During the 13 th century the mouldings of the various architectural members became more and more delicate, and the half rounds gave too soft a form to be retained long. the received a projecting edge A. (4).

In the 14 th century the sharp edge of the round did not a

quality, uniformity of grain, length and natural straightness, than for great dimensions. Oak trees only become very large when 150 or 200 years old; then the heart tends to decay, and at the heart commences the dangerous rot of great timbers. We refer our readers to Art. Charpente, where we prove by examples, that if mediaeval carpenters selected structural timbers with great care, they were no less scrupolous in the manner of shaping, framing and placing them.

BOISERIE. Wainscoting. Paneling. (Art. Menuiserie).

BOSSAGE. Bosses on Masonry.

This name is given to the rough projection of a stone, whose edges alone are relieved by a chisel draft, as shown by Fig. 1. In structures of cut stone to be rapidly erected, using only the stonecutting absolutely necessary for setting the courses without loss of time, men are sometimes satisfied with cutting the beds, joints and angles of stones, without dressing the surfaces between these edges. The Romans used this rapid mode of building, and during the middle ages we see certain structures on which rough bosses have been left on the visible face of each stone. Particularly in works of fortification of the end of the 13 th century, this species of construction appears, especially in countries where the very hard nature of the stone does not lend itself to dressing. All parts of the enclosure of the city of Carcassonne built under Philip the Bold h have surfaces with bosses; we saw them likewise from about t the same epoch at the great tower of the old archbishop's palace of Narbonne, at Aigues-Morts, etc.

Bosses disappeared from the surfaces of stone during the 14 th and 15 th centuries, to reappear in the 16 th with the imitation of Italian architecture. They then even decame a decorative motive in civil and military architecture; they are rough or cut in planes (2), diamond panels (3), hemispheres (4), as may be seen on some fortified towers of the end of t the 15 th century or the beginning of the 16 th, [1] and notably on the surfaces of the great tower of the north gate of the enclosure of Vezelay, built at the beginning of the reign of Francis I.

Note 1. p. 213. These hemispherical bosses are frequently

avoided as much as possible, as much to not weaken the wood as to avoid chances of rot. It frequently happened that timbers in carpentry received a coat of paint, that seems to be only a mixture of ochre in salt water or alumwater; and indeed a wash of seasalt or alum prevents insects from attaching themselves to the surface of the wood; it gives it a beautiful grayish-yellow tint of a silky appearance. It has been assumed that chestnut wood had the property of driving away spiders, and it has been concluded from the absence of spiders in old roofs, that these were of chestnut; but spiders only remain where they can live, and timbers well freed from sap, whatever their species, produce few or no worms or flies, and cannot serve as habitations of spiders.

Note 1. p. 215. This belief in the influence of the moon upon wood at the time of felling is still retained in some provinces of the centre of France, to the extent that timber cut during a favorable moon sells higher than other kinds.

As for tembers employed in floors and half timber work during the middle ages, they were not always enclosed between c coverings, as they are today; at least two of their faces always remained in the free air; now that condition is necessary for their preservation. Floors were composed of a series of beams or visible joists covered by a floor, on which were set the tiles or bricks; the half timber work left its external and internal surfaces visible. In that condition the duration of wood is unlimited, while it heats, ferments and rapidly decays when completely enclosed. Every day we see floors not more than twenty or thirty years old, whose joists are e entirely rotten. It will be objected, that these floors were constructed of green wood; that is possible. But we have seen beams of floors, that have remained visible for two or three centuries in perfect condition, but decaying in a few years when enclosed by plastering; then to thisk their green condition is not to be referred their decay when enclosed, but to the lack of air producing rot.

It was believed, particularly since the 17 th century, that the larger the timber, the better it resists destruction; that is an error not shared by the carpenters of the middle ages. We have already stated, that timbers employed generally in c carpentry were not of very great dimensions; they sought more

oak perfectly straight, uniform in size from the ground to t the upper branches, and very tall although of a rather small diameter. These oaks that appear as if grown for carpentry, did not need to be split by the say to make tie-beams, principals and kingposts; men were satisfied with squaring them with care; not being split and the heart thus not being exposed, they were less likely to crack or twist and retained their n natural strength. These timbers (that are easily recognized by the number of their concentric layers) are not old; they usually count 60, 80 or 100 year at most for timbers of large dimensions. The principals forming a truss are themselves of straight wood and not split, and the rafters scarcely count 60 years, sometimes attaining a length of 40 or 50 ft. with sides of 8 × 8 ins. Evidently our forests no longer produce these woods.

Note 1. p. 214. The old carpentry of the cathedral of Charartres was burned in 1836; that of church S. Denis was destroyed, but numerous fragments of it exist.

Mediaeval carpenters seem to have feared to employ timbers of great dimensions in even the largest works of carpentry, that were consequently very old; if they had need of a large timber, for example the kingpost of a spire, they joined together four pieces; this was also a means of avoiding the twists so common in single timbers. When they had to execute a g great work, they went to the forest to select the trees; these were barked before felling them; they were stored for several years in advance in the open air, but sheltered and entirely squared. Felling occurred in winter and in the duration of a certain moon. [1] True or false, this belief demonstrates the importance attached to these preliminary operations. The timbers being very dry after remaining a long time in the air or an immersion designed to dissolve and remove the sap, it was brought to the workyard. In placing it care was redoubled; w wood cut vertically and placed against masonry absorbs dampness from the stone; to avoid rot that results from that absorbtion, either a sheet of lead or a small plank cut with the g grain was sometimes nailed on the ends of timbers touching t the masonry; besides the greatest care was taken to isolate the plates from the stone, so as to allow the air to circulate around the feet of the principals or rafters. Joints were av-

the practical man scorns scientific observation; the learned man is unpractical. The learned man works in his study, and never goes to the workyard; the practical man does not observe, he seeks to produce rapidly and cheaply. The bad habits introduced by the love of money, ignorance and routine follow their cause, while the learned observer composes his books a and establishes his formulas.

The middle ages, that for many persons not practitioners it is true, was still an epoch of ignorance and darkness, and so far as we know left no book on the nature of the woods and t the best means of using them in construction; but that epoch did better than this, it knew how to place them in the work, to erect works of carpentry whose presentation is still perfect, while our timbers used scarcely twenty or thirty years since are rotten.

We shall attempt to utilize the purely practical observations of the carpenters of the middle ages on the woods; this survey will perhaps have its utility. It is asserted that much of the carpentry of the middle ages was made of chestnut; we are obliged to confess, that so far we have not found any carpentry work of that period, whose texture resembles that of this species. All the carpentry that we have visited, those of the cathedrals of Chartres and of Paris, S. George of Bocherville, the bishop's palace of Auxerre, church S. Denis, which date from the 13 th century, [1] those of the cathedrals of Rheims, Amiens, church S. Martin-des-Champs, chapel S. Germer, hospital of Tonnerre, and so many others, that it would take too long to mention, and that date from the 14 th, 15 th and 16 th centuries, appear to us to be of oak, and to have no r resemblance to the chestnut wood, that we now have in our forests. Yet it must be stated, that the oak timber then employed was of a species different from that generally adopted in modern structures. The particular characters of those old timbers are these; equal dimensions from one end to the other of the timber, little sapwood, a porous and silky straight grain, n nearly an entire absence of knots and cracks, stiffness, uniform color at the heart and on the surface; thin and uniform concentric layers, and lightness (probably due to their dryness. It is certain that in the middle ages and even until t the 17 th century, men possessed in our forests a species of

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cities were consumed. This scourge became so frequent, especially during the Norman invasions, that men must think of making public edifices and private dwellings more durable by replacing timber by masonry. Vaults were substituted for visible carpentry. Palaces and houses had walls of brick and stone instead of those half timber buildings so common from the time of Gregory of Tours and also long after him.

After the 11 th century, timber was scarcely employed in p public edifices except to cover the vaults and receive tiles or lead; in houses only for floors and roofs. When the disasters caused by negligence, by disorder and wars were forgotten; when cities assumed a great commercial importance; municipal sites had acquired value because of the increase of the population in the enclosures that could not be enlarged, private structres in timber reappeared as being more easily erected, and particularly because losing less ground than masonry structures. And indeed in commercial cities of the 1; th century, such as Rouen, Caen, Paris, Rheims, Troyes, Amiens, Beauvais, were especially built houses of wood in place of the stone houses of the 12 th and 13 th centuries.

From the 13 th century the provinces of the South were in decadence; the enclosures of cities being scarcely filled did not require this economy of space, the inhabitants continued to erect houses of stone or brick; besides the forests of those countries were already in great part devastated from the epoch of the religious wars of the 13 th century, and the climate is less favorable to the replanting of hard woods than our own. It is then particularly in the provinces located north of the Loire, that one must see wooden structures, where this material was employed with a perfect knowledge of its p precious qualities. Now if we posses today works filled learned statements on the woods, if we know perfectly their specific gravity, hardness, degree of resistance. if numerous experiments have been made on means of preserving them, on better culture and management of forests, yet it must be recognized, that in practice we scarcely think of these learned researches, these professional observations; that we discourse wonderfully on the woods, and that we too frequently employ them without regard to their qualities, and as if we did not know the nature of that material. Unfortunately in our days,

that case the chamfer is cut at an angle of 45 degrees for b broad transverse arches and more than 45 degrees for diagonal or wide arches.(6). Thus more strength was left to transverse arches and more lightness was given to diagonal arches.

The chamfer is in fact only preliminary cutting, and in pointed architecture it is cut because the moulding for which it is intended to prepare. (Art. Epannelage).

BLOCAGE. Rubble. Rough Rubble.

By this word is designated a mass in masonry composed of l large or small blocks of stone cast at random into a bed of mortar. All Romanesque structures are generally composed only of a stone facing enclosing rubble. During the pointed period, the resisting architectural members, except the buttresses or the substructures of towers, being reduced to the least possible horizontal section, generally contain no rubble; rubble is then found only in the centres of great pears, thick buttresses or in foundations. (Art. Construction).

BLOCHET. Bearing Block at foot of Principal.

A term in carpentry. (Art. Charpente).

BOTER. A Drain.

An old term signifying a sewer or drain.

BOIS. Wood. Timber.

By this word in architecture is designated the woody portion of trees suitable for carpentry or joinery. The most excellent wood for construction is oak. The ground of Gaul was famed in antiquity for the abundance and quality of its oak timber. T The Romans obtained from this country the timber employed in the construction of their edifices or navy; and such was the immense extent of its forests, that long after them constructors made use of oak with incredible profusion in religious, civil and military structures. During the Merovingian and Carlovingian periods, churches, monasteries, palaces, houses, c causeways, bridges and even the enclosures of cities in great part were constructed of timber, or at least that material was a great part of the construction. The first French chronicles continually mention terrible disasters caused by fire; entire

repeated rows, and that they cover bands, archivolts and cornices, as in the provinces of the Centre. Billets alternate with mouldings and have scarcely more than a secondary importance. As an example of what we state here, we give (4) one of the archivolts of tower S. Romain of the cathedral of Rouen on which single rows of billetes alternate with flat surfacesand rounds without ornaments. In this case the billets, like the bezants, b buttons and pearls (Arts. Besants, Boutons, Perles) only break the monotony of repeated delicate and nearly equal mouldings. Billets disappeared with the last traces of Romanesque architecture.

BISEAU. Chamfer. Bevel.

Said of a cut-off angle. Constructors during the pointed period avoided sharp edges or right angles, especially on the lower parts of edifices, and when these edges were not masked by little columns or softened by mouldings, they were frequetly satisfied by chamfering them. The enclosures of doorways and windows in civil architecture are nearly always beveled toward the exterior; thus were avoided broken cornices, and yet more the inconvenient projection of sharp angles at places on edifices where passage was rapid. This principle is also found applied to carpentry and joinery; squared timbers are often chamfered on their angles.

Fig. 3 gives a chamfered king-post and tie-beam after this method. The tops of plinths in masonry in pointed architecture are always either moulded or beveled, because of that principle, that does not allow horizontal surfaces, however small they are. (Art. Base). On the horizontal angles these bevels almost always form an angle more than 45° degrees (4), while chamfers on vertical angles are cut at 45° debrees. This law is too natural to need explanation. Men desired to remove horizontal edges as much as possible; it was entirely simple to give a strong inclination to the bevel, and the angle of 45° degrees would still have presented too sharp angles, particularly in square projecting returns; while it was necessary to cut off vertical angles by a plane forming two equal angles with the two other surfaces intersecting at a right angle (5).

The transverse, diagonal and side arches of vaults built w with economy are chamfered instead of being moulded; and in

The great monastic establishments of the 12 th century possessed considerable mills for that epoch, and still may be seen the trace of the dykesconstructed to direct the watercourse t to their mills, to obtain powerful motors. Many of our works in Champagne and Burgundy still profit by these works, frequently executed with great intelligence and by the aid of immense labor.

BIENFAITURE. Well made.
An old word signifying a good construction.

BILLETES. Billets. Billet Moulding.
A term in heraldry for designating little parallellograms placed on the field or the principal charges of the shield. In architecture by billets is understood a series of little parallelograms or portions of cylinders separated by spaces, and whose more or less numerous rows overlap. This ornament was found very early on the abacuses of capitals, around archivolts and on bands. We already find billets cut on architectural members in the Merovingian period. Among the fragments of that epoch discovered underground from the Romanesque part of the church of Poissy, is found an abacus decorated by billets, that we give here (1). But it was particularly during the 11 th and 12 th centuries, that this ornament assumed a great importance in the decoration of the moulded members of edifices. The archivolts, bands and cornices of the monuments of that epoch, received one or several rows of billets, nearly always cylindrical.

Fig. 2 represents one of the external bands of the church S. Etienne of Nevers decorated by one row of billets (11 th century), and Fig. 3 is one of the external cornices of the church S. Sernin of Toulouse, which has several of them. The sections of these two figures show how these ornaments are c cut, which in spite of their simplicity give great richness to the architectural members to which they are applied, while leaving them their firmness. Particularly in the provinces of the Centre and the South, in Poitou and Saintonge, billets w were employed in numerous rows in the 12 th century. In Normandy and Ile-de-France, the use of billets was frequent at t the same epoch; but it is rare that they are presented in re-

in the 13 th century structures were composed only of thin w walls and slender points of support, concrete was no longer used except in foundations, and further this name could not be given to the irregular rubble then in use. (Art. Blocage).

Note 1. p. 207. The little column that divides in two parts this window is in white marble of the Pyrenees as well as the base and capital, the jambs and the second lintel B are of g green sandstone. The constructors then admitted that a block of concrete was less fragile than the natural stone, being o only supported at the ends and loaded on the middle. This lintel has a depth of only 10 ins. with a span of 3.94 ft. and a width of about 12 ins.

BIBLIOTHEQUE. Library.

Until the invention of printing, libraries were composed of manuscripts and could not be numerous, or the halls containing them be very large. Monasteries all possessed libraries that the copyist brothers slowly increased. These libraries rarely occupied more than one room of the conastery, of moderate extent, around which wooden cupboards were intended to contain the manuscripts. Kings and great personages from the 14 th c century desired to have libraries in their palaces. Charles V gathered at the Louvre a library very numerous for the epoch. Charles of Orleans had formed a library in his chateau of Blois. In 1427, that prince being a prisoner in England, having learned that the English laid siege to Montanges, gave authority to lord Mortemart to take from Blois its furniture and l library, and transport all to Saumur. [2]

Note 2. p. 207. Ecole des chartes. Vol. 5. p. 58. See the inventory of that library.

Yet the rooms in which the manuscripts were deposited do n not seem to have presented any particular arrangement before the invention of printing.

BIEF. Canal for Water.

A canal that takes water from a brook or river downwards to lead it to a level above the wheel of a mill, profiting by t the distance of level existing between the point of taking a and that where the mill is established. The canal is usually composed of earthen dykes; but formerly it was often merely a duct set on trestles.

BETON. Concrete.

This is masonry composed of lime mortar, sand and gravel or fine broken stone. The Romans made great use of concrete in their structures; they employed lime well burned and slaked, nearly always hydraulic, sand or perfectly pure pozzulana; w with these primary elements, they could not fail to make excellent concrete. (Art. Construction).

Roman traditions concerning construction were retained very well until the Carlovingian epoch, and one again sees in structures preceding the 10 th century masses executed in coarse concrete preserved without change. From the 10 th century to the end of the pointed period, structures erected in stone or rubble left small place for concrete, that one only finds in the interiors of masses or in foundations. Generally this concrete or filling-in masonry was badly made during the Romanesque period; these are irregular, badly mixed and tamped; the lime used is of bad quality, the saud mixed with earth. Besides the concrete should be deposited in great masses to retain its qualities; and these fillings with mortar and stone spalls, that are found in the midst of Romanesque masses faced with cut stone, dried too rapidly to acquire durability.

In the southern provinces, where the Roman method of construction was best preserved, we find until the 12 th century concrete employed for foundations and areas over vaults. It must be believed that in those countries had been acquired e experiences perfected in the making of concrete; for we saw at the castle of the city of Carcassonne windows and doorways of the end of the 11 th century, where the lintels of great span are of concrete cast in a form. We give here (1) one of those windows; the lintel A is of concrete of extreme hardness, and we have not seen a single one of these lintels broken by the load, that is however considerable. This concrete cast and tamped in a mould is composed of hydraulic lime mixed with t the muddy sand of the Aude and small fragments of bricks; the gravel is broken very fine and is almost entirely composed of green sandstone. Here the very evident intention of the constructors was to reserve thise artificial stones for the great spans; thus they regarded them as more resistaut than the sandstone of the country, but which is very hard; and they were not mistaken, for these lintels have suffered no change.[1] When

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Rev. Fathers A. Martin and Cahier, [1] is preceded by a brief prologue, that perfectly indicates the purpose ~~the compilers~~ of the book proposed to attain. "Here commences," says the author, "the book called book of animals. And it is so named because it speaks of the nature of beasts, for all creatures t that God created on earth, he created for man and to take as an example and of faith in all creation." From the moment that it was accepted that the animals of creation were created for man, and so that the study of their habits should be an example for him, one should not be surprised to see sculptured u under the portals of churches, around capitals and even on t the consecrated furniture a multitude of animals intended to recall the virtues that Christians should practice or the vices they should avoid. In the middle ages man is the centre of all things on earth, and the Church continually shows him this truth in the monuments it erects. After having represented God, his relations with men, the history of his sacrifice and the celestial hierarchy, the Church forgot no secondary beings, but made them enter into the great concert of creation. This is the most evident sign of the tendency of the ideas of the middle ages toward unity, order and classification. A All has its place in the creation, all has one purpose and one function, everything relates to man, who must account to God as responsible by his intelligence for everything created for him. Never regard on our monuments those sculptures of animals, often strange, as the caprices of artists, eccentricities without meaning; on the contrary see the unity to which tended the thought of the middle ages, the first encyclopedic efforts of the intelligences of the 13 th century, the first steps of modern science, of which we are so proud. [2](Arts. Cathedrale, Imagerie).

Note 1. p. 205. Manuscript of the Library of the Arsenal. No. 283. pp. 203.

Note 2. p. 205. We refer our readers to the Melanges archaeologiques of Rev. Fathers Martin and Cahier, for the detailed study of the mediaeval books of animals. That portion of the work of the Rev. Fathers is very complete, and is accompanied by numerous plates copied from the manuscript.

BETON. Concrete.

BESANTS. Bezant, a coin. A circular ornament.

The bezant is heraldic terms is a metal disk placed on the field or the principal charges of the shield. By bezants in architecture is meant a series of flat disks carved on a moulding. This ornament is frequent in edifices of the 12 th century; it is always of small dimensions, larger than the pearl, smaller than the button; it decorates bands, archivolts, flutes of pilasters; it is found preferably in Poitou, Saintonge and on the banks of the Loire.

Here (1) is to be seen a bit of one of the arches of the b bell-tower of the church of Charite-sur-Loire, whose archivolt and pilasters are ornamented by delicately carved bezants. T The bezant particularly differs from the pearl or the button in being flat instead of presenting a portion of a sphere. It is generally cut as indicated in Fig. 2, slightly beveled at the edge to avoid the dryness and leanness produced if cut at a right angle. Bezants have the advantage in decoration of g giving at small cost much richness and lightness to architectural members to which they are applied; their plane surface strongly catches the light, and makes them visible at a great distance in spite of their thinness; the break the monotony of delicate mouldings repeated with a flat profile, preferred by architects of the 12 th century; finally although of small importance in dimensions, they have a firmness ferfectly suited to stone structures. Pezants disappeared in the 13 th century to never reappear in architectural ornamentation.

BESTIARES. Books on Animals.

By this word are designated the collections so much in vogue in the middle ages, that contain descriptions of real or fabulous animals of creation. These descriptions are almost always accompanied by vignettes. During the 11 th, 12 th and 13 th centuries, these books on animals were copied and annotated in the monasteries after the ancient authors with varying force and new stories, and had a symbolic meaning. The qualities or defects of each animal were presented as a representation of the state of the human soul, of its vices or virtues, as a personification of the Church or even of Jesus Christ. The b book in Picardy prose of the beginning of the 13 th century gives at full length in the Melanges archaeologiques of the

of decoration. Near the southern doorway of the church of Villeneuve-le-Roi is to be seen yet a stoup attached to the right hand pier, this stoup is combined with the construction. [2] Its courses agree with the courses of the pier; it is not an accessory attached afterwards; it was foreseen in building. The polygonal stoup is surrounded by a finely carved canopy. That little structure, like the construction to which it is attached, dates from the first half of the 13 th century. [1]

Note 1. p. 203. The drawing of this stoup was given to us by M. Millet, to whom we already owed precious information.

Later during the 14 th and 15 th centuries, the stoups resume their appearance of furniture, and nearly always are composed of a polygonal or circular bowl resting on a column; t they no longer form a part of the edifice. Sometimes the sculptors pleased themselves by representing at the bottom of stoups serpents, frogs, fish, puerilities of very bad taste, that are admired by many persons. If these fancies had as purpose to remind the faithful to take the holy water on entering the church, it must be confessed, that this singular fashion of attracting attention was a complete success. At the epoch when religious zeal grew cold, artists labored to excite curiosity in the lack of other feeling. We think it necessary to class these sculptures of animals at the bottoms of bowls of stoups among caprices, sometimes burlesque, of sculptors of the 15 th century, however men wished to find a symbolic meaning in these figures.

At the foot of tombs in cemeteries it was usual to place s small stoups, or to hollow them in the stone itself covering the tomb; such may yet be seen in great numbers in Brittany, Poitou and Maine, where the custom has been retained till our days. These little stoups were sometimes in metal, iron or bronze, accompanied by a sprinkler attached to the stoup by a chain.

The age of the Renaissance carved these stoups in marble w with great richness and supported by figures. But unfortunately the religious wars destroyed these little monuments in France. Italy and Spain have preserved for us a great number of examples.

BARCEAU. Cradle. Centering. (Arts. Architecture, Construction, Voute).

We do not dare to affirm this. Was it an altar, as some authors appear to believe, Mabillon among others? The absence of monuments existing today leaves us in doubt in that rescept.

Au engraving given by Dom. Plancher, [2] in his Histoire de Bourgogne, and representing the porch of the abbey church of Moutier S. Jean, shows a very important stoup placed before the mullion of the central doorway. The facade of that church was erected about 1130, and the stoup seems to belong to the same epoch; as well as one may judge from the engraving, very coarsely executed, that stoup appears to be of bronze and is placed directly under the feet of the statue of the Virgin, that forms a part of the mullion. We give here (1) a copy of this stoup with its surroundings. [3] It was supported on a column whose excessive slenderness causes us to suppose that it was of metal.

Note 2. p. 200. Hist. gen. et port. de Bourgogne. Dijon, 1 1739. Vol. 1. p. 517.

Note 3. p. 200. While preserving as faithfully as possible the forms indicated by the engraving, we are permitted to make our drawing approximate the style of the 12 th century, the engraving being entirely without character.

The absence of the stoups of an early epoch in our churches should not give reason for surprise, if it were stated that they were generally executed in bronze. Indeed stone stoups, that we find attached to monuments of the 12 th and 13 th centuries, are of extreme simplicity, and we find them only in poor churches. Then one may assume with much reason, that the stoups of the rich churches being of bronze were stolen, destroyed and melted at the epoch of the religious wars. In the little churches of Soissonais, of Oise, built at the end of the 12 th century and the beginning of the 13 th, there exists a great number of stoups cut as indicated by Fig. 1 bis. [1]

Note 1. p. 201. This stoup comes from the church of S. Jean-aux-Bois, near Compiegne.

But the architects of the 13 th century loved to attach to edifices all necessary accessories; they were led to provide in the construction objects, that until then had been regarded as furniture, they must make stoups a part of the edifice near the doors, just as they frankly emphasized piscinas and credences. These accessories became for them as many motives

the ditches, nor could one enter there."[1]

Note 1. p. 199. Chron. de Froissart. Book I. Part. 2. Chap. 22. Edition Buchon.

At the end of the 15 th century, when the ancient authors were in honor, numerous translations were made of Vegetius a and of Vitruvius, and their translators or commentators labored to find in these authors applications to the military art of their own time. These labors were perhaps useful in tactics, but could not be applied to the art of sieges opposed to artillery, and the more or less ingenious combinations of war machines, that some learned men amused themselves in placing on paper, remained in the books; they neither could nor did have any practical result; thus we shall not speak of them. [1]

Note 1. p. 200. Among others we see Roberti Valturii de re militarii. Book 12. 1493. Edition of 1534. Paris. Latin, with numerous illustrations on wood, giving the strangest inventions of machines to attack and take strong places.

BENITIER. Stoup for Holy Water.

A small bowl in which is left the holy water for the use of the faithful at the entrance or exit of churches. There are two sorts of stoups, portable and fixed. We shall occupy ourselves with the latter alone, the former being a part of the utensils for use in the worship. It would be difficult for us to state at what epoch fixed stoups were placed at the doors of churches. We know some very shapeless stoups, that appear to have been built quite anciently into the jambs of doorways of churches of a distant date; but it appears to us difficult to say whether these stoups belonged to the epoch of the construction of these edifices, or were placed afterwards. These stoups, when primitive, are rarely more than very small bowls of stone in the form of a hemisphere. We should indeed be tempted to believe (although we cannot base our opinion on any certain proof) that in churches preceding the 12 th century, the holy water stoup was a vase of metal placed near the entrances of churches, when the doors were opened. This conjecture is based only on the absence of all arrangements indicating the place of that accessory. Under the porches of the primitive churches of the order of Cluny, there was nearly always a stone table of small dimensions placed near the doorway.

"And know that the French before Breteuil did not delay to imagine and conduct several assaults to injure more the garrison. Thus the knights and squires who were within planned night and day to damage them; and those of the host caused to be raised and built great machines, that cast in night and day on the roofs of the towers and injured them much. And the king of France had made by a great number of carpenters a great tower in three stories, that was moved on wheels where t they desired. And each story could well contain two hundred men and all to aid them; and it had galleries and was covered against too strong arrows, and some were called for one thing and the others were equipped for assault. It was not so soon done, carpentry nor work. Intermediate parts that were made of wood or stone were done by the peasants of the country, to bring and pile great abundance of wood and throw all into the ditches, both straw and wooden timbers, to bring the said engine on four wheels to the walls to fight with those from inside. Thus it might indeed take a month to fill the ditches at a place where one desired to attack and bring the machine. When all was ready, into this tower entered a great number of good knights and squires desiring to advance themselves. Then this tower on four wheels was brought even to the walls. Those of the garrison indeed had seen the said tower built, and they knew well the arrangement in part how they would be attacked. Thus accordingly they were provided bith guns throwing great stones to break everything. Thus they depended so much on artillery to attack this tower and to defend them with good will. And from the beginning as they brought up their cannon, they came to fight openly, hand to hand with those of the tower. There were done some great feats of arms. When they were beaten, they began to draw up their cannon, and to fire on and i into that tower, and to fire abundantly great stones, that w wounded and killed a great many, and so beat them, that they knew not whom to hear. The fire was Greek, caught on the roof of the tower and compelled those inside to emerge, for otherwise they would all have been burned and lost. When the companions of Breteuil saw this, they uttered great shouts and cried aloud:-- S. George! Loyalty and Navarre! Loyalty! And then they said:--"French lords, by God, you will not have us as y you think." Thus the greater part of this tower remained in

in the G.ulish fashion, soon took fire, and in an instant th wind carried the flames through the entire camp. Then uttering great cries as if the victory was already for them, they advanced their towers and their combined shields, and began to s scale our entrenchments. But such was the courage and stability of our troops, though everywhere surrounded by flames, afflicted by a storm of arrows, knowing that the fire devoured their baggage and property, no soldier left his post or even thought of looking to the rear, but all fought with fury. That day was rough for us; yet many of the enemy were killed or w wounded; heaped at the foot of the rampart, the late comers prevented the others from retreating. When the fire had weakened a little, the assailants having rolled one of their towers near the entrenchment, the centurions of the third cohort posted at that point retired, withdrew all their men, and calling the enemies by voice and gesture, invited them to enter if they would, but not one dared to come forward. They were dispersed by a hail of stones, and their tower was burned."

Note 1. p. 198. Book V. De Bello Gallico.

Henceforth until the use of artillery, men did not cease in Gaul to employ this means of attack in sieges. It is unnecessary to state, that no practical data on these enormous machines remain to us. We must adhere to the quite vague descriptions that remain to us, to some vignettes of manuscripts executed in such fashion, that it is impossible to ascertain t the means employed to move them. During the middle ages these movable towers were large enough to contain a numerous troop; they were divided by floors into several stories pierced by slots, and their tops with battlements had a height claculated to dominate the crests of the towers or walls attacked, a and received a bridge falling on the parapets of the besieged, when the tower was brought beside the wall. These great works of carpentry were covered externally with fresh hides and great woolen fabrics wetted to protect them from incendiary projectiles. Figs. 15, 16.

At the siege of the castle of Breteuil by king John (1356) mention was made of a movable tower for the last time, and t the description that Froissart gives of that siege merits being transcribed, for artillery commenced to play an important part in destroying the ancient machines for assault, so formidable until then.

as gates, built across a street, the belfry towers of S. Antonin, Troyes (now demolishedU, Avallon, Bordeaux. The last b belfry is very remarkable, being composed of two great towers between which opens a public passagea Above is a second arch crowned by battlements, and a roof covers the bells. (Art. Porte).

In some cities one of the towers of the principal church s served and still serves as belfry. At Metz, Soissons, S. Quentin, one of the towers of the cathedral has continued for that use. As for belfries belonging to city halls, we refer our r readers to Art. Hotel de Ville.

BEFFROI, MACHINE DE GUERRE. Belfry, a War Tower.

During sieges in the middle ages, movable wooden towers served to throw on the walls troops of soldiers, who thus made the assault at a level. (Art. Architecture Militaire). These towers took the name of belfries. This war engine was in use in antiquity. Cesar in his Memoirs frequently indicates their use. After having constructed terraces that allowed the great machines to approach the walls attacked, filling ditches and establishing mantlets that covered the laborers, the army of Cesar at the siege of a strong place defended by the Nervians, built a wooden tower out of range of the arrows of the besieged.

"When we came to erect the tower," says Cesar, [1] "after having placed the mantlets and built the terrace, the Nervians laughed from the height of their walls, and loudly asked what we were going to do with such an enormous machine at such a great distance; by what hands and what efforts of such small men it could be moved (for the Gauls on account of their high stature despised our small height); do we pretend to bring t that mass against their walls? But when they saw it move and advance toward their defenses, they sent deputies to Cesar to treat for peace."

Note 1. De Bello Gallico.

Gaulish imitators, according to Cesar himself, did not delay also adopting movable wooden towers. When the camp of the Romans was besieged by the revolted Nervians, [1] "the seventh d day of the siege, a great wind having arisen, the enemy shot blazink darts into the camp, and slung balls of clay reddened in the fires. The barracks of our soldiers covered with straw

was to take from the municipal body of that city not only the means, but the right of assemblage. During, the entire duration of the enterdiction, affairs were suspended or left to the d decision of the royal officers. Such a state of matters did not last long, and the city could usually shorten its duration by purchasing the right of the bells. (Les Olim. I. p. 836 of text, note 126).

Noyon, Laon, Rheims and Amiens possessed belfries. The last city retained its own until our days; but rebuilt on several occasions and changed in the last (18 th) century, the base alone of the square tower yet presents some traces of constructions erected during the 13 th and 15 th centuries. [1] The other great cities just named have allowed their towers to be entirely destroyed. It is no longer in France, except in some cities of the second order, that one still finds belfries.

Note 1. p. 195. See Desc. du beffroi de la ville d'Amiens, by M. H. Duval. Amiens. 1847.

We give here (11) that of the city of Bethune, which is very well preserved and can give an idea of these municipal structures in the 14 th century. The lower story is masked behind private houses,and contained the services already mentioned. A large room with eight openings enclosed the great bells; a above was a room pierced by slots and little openings. A screw stairway placed in one of the angles ascended to the upper g gallery, flanked at the angles by turrets with battlements. A roof covered with slate and lead contained a chime and an upper lantern with gallery for the watchman. According to custom, a weathercock crowned the spire. The cities of Auxerre and of Beaune also had their belfries. Here (12) is that of Evreux, built in the 1; th century and that is complete. We give its plans in the three stories A, B, C, and a perspective. Municipalities displayed a certain luxury in these urban structures; they required for them elevated tops, often decorated by turrets, finials, large dormer, that perceived afar, they evidenced the wealth of the city.

We said in commencing, that the bells of the commune in certain cases were suspended over the old gates of cities. Perhaps in memory of this temporary arrangement many isolated belfries were intentionally built in the form of a gate surmounted by one or two towers. We shall cite among belfries serving

municipal keep. There only remain to us in France a very small number of these monuments of the first and most legitimate e efforts of the people to conquer civil liberty, and also the rare examples that we posses do not back of the 14 th century.

The first isolated belfries are composed of a square tower, most frequently surmounted by a carpentry roof covered with slate or lead, in which were suspended several bells. A gallery or story pierced by windows on the four sides served as a post for the watchman, who by day or nighe warned the citizens of the approach of enemies, discovered fires, aroused the citizens by the sound of the bells or of trumpets. From the top of the belfry sounded the hours of labor or of rest for the workmen, sunrise, curfew, and flourishes of trumpets announced the principal festivals of the year. The tower ordinarily contained prisons, a hall for meetings of aldermen a and some dependencies, such as storeroom for archives, armory for arms to be distributed to the citizens in troublous times, or when it was necessary to defeud the city.

During the 14 th century, when great clocks had become common, belfries received dials indicating the hours. The belfry was long the sole city hall, the particular municipal monument. When the feudal power is strongest, its first act of authority is the destruction of the belfry. In 1322 the bishop and chapter of Laon obtained from Charles IV a decree in which it was stated. "That iu future in the city and suburbs of Laon, it cannot have there a commune, corps, university, aldermen, mayor, jurors, a common treasury, belfry, bell, seal, nor any other thing belonging to the state of the commune." [1] And later in 1331, Philip VI issued a second decree confirming the former and ending with this clause:-- "There shall no longer be at Laon a belfry tower' and the two bells therein shall be removed and confiscated to the king. The two other bells in the tower gate Martel shall remain there, the large one serving to sound the curfew in the evening, the break of day in the morning and the alarm; the small one to assemble the watch." [2]

Note 1. p. 184. A. Thierry. Lettres sur l'histoire de France. Lettre 18.

Note 2. p. 184. The bells were placed "(Latin text)" (Les Olim, decree XI, 88, art. 9). To remove the bells from a city

with a great swing, the oscillation of the top of this bell= cage is about 2 ins., scarcely sensible at the level B of t the galleries, and inappreciable just above the bottom frame.[1]

Note 1. p. 181. This carpentry work, that replaced a bell= cage of the 17 th century, was executed in good oak wood by M. Bellu, contractor.

In the North it was often customary to establish bell-cages even in the woodwork of wooden spires covering towers of moderate dimensions; this system weakened the masonry walls much, and its use must be renounced, when the bells were of considerable weight. The spires of the cathedrals of Rheims, Paris, Beauvais, Rouen, S. Chapelle of Paris, etc., contained a great number of bells, but of small dimensions. The catnedral of A Amiens, that has retained its spire of the beginning of the 16 th century, contains a little bell-cage independent of the carpentry in its low lantern. In this case the bell-cage was not furnished with louvres; its timbers were simply covered by lead and set on a terrace receiving the rainwater driven by the wind into the midst of this carpentry in the open air.

BEFFROT DE COMMUNE. Belfry of the Commune.

When in the 11 th century the first communes, assembled at the sound of the bells, and almost always then the towers of the churches gave the signal for the assembly. The regular a and the secular clergy were generally opposed to these conquests of the citizens, to these conspiracies that tended to shake off the feudal yoke. (Art. Architecture Militaire). The laity and the abbots refused the bell-towers of the churches to the new citizens, and did not allow the bells to be rung for any purpose other than the offices. That opposition was frequently the cause of scenes of violence deplored by t the chiefs of the freed cities. Rather than provoke continual wrangles, the citizens installed bells over the gates of the cities on towers intended for quite other uses than for bell-towers, and it was only at the end of the 12 th and the beginning of the 13 th centuries, that certain communes could think of erecting towers solely reserved for the bells of the city. These towers took the name of belfries. They were isolated at first; they were the visible sign of the freedom of the commune. Later they were combined with the city hall; this was the

these observations have allowed us to restore an enormous bell= cage after these data, that of the south tower of the cathedral of Paris, and with the lack of a complete old work, we b believe ourselves able to represent this, in which we sought to profit by the experience of the mediaeval carpenters, and that summarizes the principal rules set above. [1]

Note 1. p. 180. Our Dictionary primarily tends to a practical end, and we hope that we are not blamed for giving an example of a new construction, erected according to the rules and principles for which the old examples cannot furnish in a complete manner. The new bell-cage of Notre Dame of Paris has done well for five years, without it being possible to detect the slightest change in the entire system.

Fig. 7 gives the plan of the lower horizontal frame of that bell-cage, that rests on a projection of the masonry arranged for that purpose. Instead of a single intermediate framework, there are two intersecting at right angles, because of the e enormous height of this carpentry work and to give more fixedness to the middle part. One of these two wooden frames only rises to the third story, the two upper stories retaining only a single dividing framework to permit the play of the great bells. Fig. 8 gives the plan of the top frame of this bell= cage, at the top of which is placed a service walk and a glazed gallery covered with lead. Fig. 9 gives one of the four lateral frameworks, and Fig. 10 the division framework extending to the top of the carpentry. The second division frame at a right angle is entirely similar to this, if only carried to the point A. The entire work is fitted outside entirely a around with sound deflectors covered with lead, and these louvres being only fixed to the carpentry, follow its movements without the oscillations affecting the stone piers of the tower. According to the old method, there is then a work entirely independent of the masonry, fitted with its accessories and protected from storms by the louvres intended to deflect the sound of the bells. The rain introduced through the tall openings of the tower and driven by the wind strikes a well covered and isolated structure, drops from one louvre to another as far as the point B, where a free walk is isolated from the masonry and also covered with lead, sends it on to the external stone galleries. When the great bell hung at C is rung

or pulled by the swinging of the bells, whose entire weight is abruptly thrown from one side to the other.

At the end of the 15 th century, the framework of bell-cages was composed of a succession of X-braces, whose connection at crossing made them much more rigid, and prevented the effects of oscillation on tenons and mortises. Indeed when the stories of the wooden framework of bell-cages is composed of only the central kingpost E, two corner posts F and two braces A B, t the bell swinging and in the position indicated by Fig. 3, t the joint D was in tension; it resulted that the cap K soon m moved dangerously from L to M. The addition of two timbers G H stopped this movement by always transferring the weight of the bell to the vertical E, whatever its position. Starting from this principle, the carpenters composed the wooden of bell-cages of lattices in lozinge form with great resistance (4), ties of doubled timbers at X with keys to avoid the thrust of the timbers P P against the corner posts. The oscillation of the bell-cages was much reduced by this combination. But the movement of the great bells is so powerful, that these wooden frames being made rigid, pulled entirely in one piece, sometimes to one side, sometimes to the other, finally caused the entire carpentry to place the bottom and top ties in two planes not parallel, as indicated in Fig. 5. The four lateral frames and the central frame warp, and the final enclosure at the top strikes the masonry walls of the towers at A; the bells swing badly between these warped surfaces and their posts tage a slight rotary movement, strike the edges of the bronze and break the bells. To avoid that inconvenience braces R are placed at the angles of each frame at each story (6); then t the frames are kept in their places. These improvements successively made by the skilful carpenters of the 15 th century were forgotten a century later, and the very numerous b bell-cages, which date from the 17 th century, in spite of the unusual dimensions of the timbers, are poor and badly combined works of carpentry, badly executed, that are weakened by their own weight.

Fires, lack of maintenance, unskilful repairs have destroyed or chauged the bell-cages erected in the 13 th, 14 th and 15 th centuries; what we give here can be only the result of some observations made of the now shapeless remains. However

and until the use of artillery, are also named belfries or sheds.

BELL-CAGES OF CARPENTRY.

The bell-towers of churches are always arranged to contain bell_cages of carpentry, in the midst of which swing the bells. These bell-cages are set in a recess or on corbels built in the construction of the towers, and they rise receding to their tops, so as not to touch the internal surfaces of the masonry, when the movement of the bells causes them to vibrate, and also to prevent greater resistance to the effect of swinging the bells when rung. When the use of bells of considerable weight was adopted, they must be suspended in bell_cages of carpentry independent of the masonry construction. In France , Belgium and Germany, already were constructed bell-towers of such diameter, that one must assume the use of large and numerous bells, and the construction of very important internal bell-cages. Not a single one of these internal carpentry works preceding the 16 th century remains to us. Thus we cannot give an example based on an existing monument.

Before 1836 the lod bell-tower of the cathedral of Chartres contained a considerable bell-cage of the 14 th century; unfortunately that curious work in carpentry was burned at that epoch, and we possess of it only a drawing giving the bottom and next story (1). Two great queen posts divide this bell-cage into two bays for its entire height, and the bells were supported in each of these two bays; the trunnions of their axles rested on two lateral frames of wood and on caps connected with these principals supported by curved pieces beneath and relieved by principal rafters at each story, as indicated by Fig. 2. A wooden stairway placed in an angle served all t the stories of the cage and was intended for the ringers.

Before the 15 th century in the construction of bell-cages, carpenters appear to have been principally occupied in maintaining the middle framework (for the old bell-cages are always divided into two bays) by principals or inclined timbers transferring the central load to the lateral frameworks. But one must recognize, that trusses framed according to Fig. 2 and set on each other, were insufficient to resist the load and especially the vibrations caused by the movement of the bells; that the joints must be strained, being successively pushed

great lines of the architecture their function, to reject forms that might destroy their simplicity. If they adopted the round or the zigzag in certain cases, this was only in subordinating them to moulded members retaining the purity of the principal curves, making them play a very secondary part. Yet we shall cite the great transverse arch at the entrance of t the choir of the church S. Martin-des-Champs at Paris, which is flanked by two great rounds exhibiting very prominent zigzags and of unusual dimensions; but it must be said, that this transverse arch is not at the scale of the architecture of the choir, and that the master of the work desired to conceal the heaviness of that architecture by a sort of dentils to give it lightness; it is an exception. [1] The abuse of the zigzag moulding in edifices of the last Romanesque period in Normandy and in England, wearies one and gives a monotonous appearance to the architecture of this epoch. This zigzag moulding appears badly on the abacuses of capitals, when it takes a certain importance; it produces a good effect only when comprised between angles accenting the curve of the arch, as in the choir of the cathedral of Canterbury (3), [2] when its teeth do not project enough to break that curve. Zigzags are again seen in the architecture of the first pointed period, as at the cathedral of Noyon, in the choir of S. Germer. They entirely disappear when the architectural systed adopted at the end of the 12 th century is developed, i.e., about 1200.

Note 1. p. 186. This transverse arch was taken down and rebuilt higher in the 13 th century, when the nave of this church was rebuilt, as well as the high vaults of the choir.

Note 2. p. 186. In speaking of French architecture, one should not be surprised if we frequently cite the cathedral of Canterbury. The choir of that cathedral was built by architects from France. (See Architectural History of Canterbury Cathedral, by Rev. R. Willis. London. 1845.

BEFFROI. Bell-cage. Belfry. Tower.

By this word is designated a carpentry work destined to contain bells and allow them to be rung; taking the container f for that contained, the name of belfry is given to towers containing the bells of the commune. Rolling towers of wood intended for the attack of strong places during the middle ages,

of these works. (See Latin text). Also in Art. Boulevard see the little bastions analogous to those mentioned by Albert Durer, attached to the flanks of the fortress of Schaffhausen.

The name of bastion or rather of little bastion was scarcely applied to important advanced defenses during the 16 th century. These works were rather designated by the names of bulwarks or platforms, which they lost only about the first years of the 17 th century, to definitely resume the name of bastion, continued until our days. (Art. Boulevard).

BATONS - ROMPUS. (Broken sticks). Zigzags. Chevrons. These are broken half rounds or bands frequently found in arches, archivolts, round arches, bands and even pilasters in the architecture of the 12 th century. Stonecutters of that epoch had attained a perfect execution, and took pleasure in varying the numerous members of archivolts, junctions of mouldings by means of combinations of lines, that produced a great effect by the play of light and shade. The most common zigzags are those given in Fig. 1, reproducing the archivolt of one of the windows of the cathedral of Tulle. This ornamentation is combined with the jointing of the voussoirs; these were cut and moulded before setting, nothing was simpler than tracing the zigzag round on each of these, as shown by the voussoir A; the assembling of these voussoirs produced much effect at small cost. But particularly in Normandy this means of ornamenting the archivolts was much employed from the 11 th to the 13 th centuries. The cut stone used in that country 1 lent itself to this sort of mouldings. Not only in Normandy does one find a great number of moulded arches designed as in Fig. 1, but the zigzags are doubled, reversed (2), [1] even sometimes intersect. The Norman monuments of England give us the most numerous and richest examples of this kind of decoration. [2]

Note 1. p. 184. Doorway of the bell-tower of S. Loup at Bayeux.

Note 2. See Glossary of Terms used in Greek, Roman, Italian and Gothic Architecture. J. H. Parker. Oxford. 1850.

The architects of Ile-de-France only employed with discretion the zigzag moulding. They avoided oddities, labored things, and appeared to endeavor in their edifices to leave to the g

great cohesion, as powerfully showing the nucleus of the bastion; and he is not mistaken. He built a wooden floor for the service of the upper battery, so as to facilitate the movement of the guns. The details of this work are well studied and explained; the casemate battery, besides its embrasures F, is pierced by vents G for the smoke and by flues H, in order to obtain a draft. The upper parapet is built in section in a c circular arc to make hostile balls rebound; the embrasures ha have mantlets of timbers rotating on an axes and masking the guns, while the artillerists are occupied in loading them. ((Art. Embrasure). This isolated bastion could hold out even if the curtain were in the power of the enemy; we find there again a remnant of the fortification of the middle ages; and this bastion is a fort regarded as less easily taken than the curtains. The ditch is very wide, 200 paces, and its trench is excavated along the bastion, as indicated by the general section X, Fig. 10. The counterscarp of the ditch is faced. Fig. 11 gives the external elevation of the half of this bastion. Note the great discharging arches, that mask the embrasures and transfer the entire weight of the external wall to the heads of the convergent walls. This elevation also shows the openings of the vents and flues, the wooden mantlets of the upper embrasures, and the curtains of the city, whose galleries are covered by a continuous shed. This is a very beautiful construction, and what it may be reproached with is the enormous expense it would require. It seems that Albert Durer may have attached great importance to ditches, he made them very wide and deep, and often defends them by little isolated circular bastions, like our modern caveliers. He leaves these little works below the level of the crest of the counterscarp, and only considers them as defenses suitable to strike an enemy entering by a trench at the level of the bottom of the d ditch, and arranging to pass it to cine the foot of the wall or to scale it by means of ladders. In the Chapter of his work entitled "Antiquae civitatis muniendo ratio," in which he explains how one should strengthen by outworks a city, whose o old walls with towers it is desired to retain, he constructs these little isolated bastions at the bottom of the ditches. (12). [1]

Note 1. p. 183. Here is the passage indicating the utility

studied with care; that artist, painter and architect, was n not only an ingenious theorist, he directed the construction of a part of the defenses of the city of Nuremberg, and these defenses are a very remarkable work, for the epoch in which they were erected. One must assume that his system had a great vogue in a part of Germany and Switzerland at the beginning of the 16 th century, for one finds yet in those countries nu numerous remains of defenses, that recall the principles developed by Albert Durer in his work, and we shall cite among others the fortress of Schaffhausen. (Art. Boulevarde). To r reinforce and flank a front, Albert Durer constructed wide a and high bastions with casemate battery at the level of the bottom of the ditch, and an uncovered battery at the top. T These bastions present an enormous volume of masonry; it isolates them from the ramparts or connects them with these at the gorge. The plan of his bastion is an arc of a circle with a parallelogram as a base. We show (7) this plan at the level of the bottom of the ditch; the terrace at the level of the ground of the city communicates with the casemate battery by one or two stairways C. The two stairways D communicate from the terrace A to the upper and lower batteries. Fig. 8 gives the plan of the bastion beneath the floor of the upper battery, and Fig. 9 is the plan of that battery. The structure is composed of concentric walls strengthened and connected by radial or parallel walls in the rectangular part of the bastion, so as to form a terraced grillage presenting a great resistance to projectiles. The casemate battery can contain four guns to flank the curtains and eight guns to protect the front in a circular arc. The uncovered battery of the top commands the glacis and the country, and it has two guns for flanking fire and nine guns on the curved front. This bastion may have about 427 ft. width from one end to the other and baout 213.5 ft. depth to the base. The transverse section of this work made in one of the two straight stairways C is very singular (10). The walls from base to summit tend to a common centre placed on the extension of the axis E, and the courses of masonry a are perpendicular to the radiii, thus forming an angle more or less great with the horizon, according as the walls are more or less distant from the centre of the entire work. Albert Durer regards this means of construction as presenting

flanking the projecting angles of the city of Langres. [4] The most important of these bastions is a circular work that defends a gate; it has three stories of batteries, two of which are casemates. Fig. 1 gives the plan of the ground story of this bastion; Fig. 2 is the plan of the second story, and F fig. 3 is the section. The embrasures of the two casemate stories are opened so as to flank the curtains. The upper battery alone must be reserved to strike the country afar. The bastions of the city of Langres are not built of earth; these are again masonry towers of great diameter, whose walls are sufficiently thick to resist a ball. The external view of the bastion (4) of which we have just given plans and a section, has retained the appearance of a mediaeval tower, unless this work be low in regard to its diameter, and that the surfaces are battering to resist better the iron balls. The gargoyles around the work demonstrate very clearly that it was not formerly covered by a roof, but by a platform. This bastion was further rebuilt a short time after its first construction, a and its height was increased; the vaults in the interior indicate a change, and the two superposed rows of gargoyles (Fig. 4) can leave no doubt, that the platform was made higher.

Note 4. p. 177. See general plan of the city of Langres. A Art. Architecture Militaire. p. 411.

Yet the first circular bastions were not always without roofs, without mentioning the great round towers of the city of Nuremberg built by Albert Durer (Art. Tour), which may pass for actual bastions in the primitive acceptance of the word, and they have always been covered; here (5) are the bastions of the old walls of Soleure likewise crowned by roofs. [1] Men soon recognized that these circular bastions were not sufficiently large, that their divergent fire could not prevent the approaches of the besiegers, that they flanked the curtains by only two or three guns, and that they did not oppose extended fronts to siege batteries. After the beginning of the 16 th century they suffered various transformations. Some extended outside to better flank the two sides of a projecting angle, as indicated by Fig. 6, [1] and their flanks were lengthened; on the contrary others extended their faces to protect a front. Albert Durer in his Art. de fortifier les villes et citadels, [2] adopted a system of bastions, that merits being

to command the country afar, and to batter the besiegers, when they hold the ditches. In France, Germany and Italy, the bastion appeared from the end of the 15 th century; the Italians pretend to be the inventors of that kind of defense; but we do not see that the facts support that pretension. In France and in Germany, round bastions arose at the same time, from 1490 to 1520. It seems to us more reasonable to suppose, that during the Italian wars at the end of the 15 th century, French, Italian, Swiss and Germans, perfected in emulation the means of attack and defense. The text of Machiavel, that we c cited in Art. Architecture Militaire [1] is far from giving to Italy that predominance over the other western countries of Europe. [2] However that may be, France and Germany, that during the entire 16 th centuryhad to sustain long and terrible wars, civil and foreign, did not cease to fortify anew their ancient places, to equip their castles with defenses suitable to resist artillery. In France the royal armies and those of the reform, besieging and besieged in turn in the same cities, at intervals of some months, taught by experience, daily added new defensive works to fortresses or perfected the old ones; it is necessary to say, that if during the unfortunate times a certain number of Italian engineers exhibited true talint, this was frequently in the service of the kings of France. A All men occupying themselves with construction in our country during that century were familiar with the art of fortification, and Bernard Palissy himself pretended to have invented a system of defense of places against the most formidable attacks. [3]

Note 1. p. 177. Volume 1. p. 429.

Note 2. p. 177. We are too much disposed to believe generally, that we borrowed everything from Italy at the beginning of the 16 th century. Perhaps some Italian captains having s studied the Roman authors, had in that epoch certain ideas on military tactics not current in France; but it is not in Vegetius, that they could learn the art of fortifying places against artillery.

Note 3. p. 177. Oeuvres completes de Bernard Palissy. Chap. De la ville de Forteresse. Edition Dubochet. p. 113. 1844.

Among the first works for occupancy, that may be regarded as actual bastions, we shall cite the great round towers fla-

either ou side or inside,but preferably outside to receive g guns in battery. wen were pressed for time; public misfortunes did not permit the use of considerable sums in the construction of this sort of works, and they were nearly always built of earth with a facing of wood or dry stones.

Note 1. p. 174. Alain Chartier, Hist. de Chas. VII.

The forts of Paris, an example of which we have seen in Fig. 4, may give an idea of the attampts made to flank the old walls and to place cannon. later under Louis XI, Charles VIII and Francis I, many of these works were solidly constructed of m masonry and took the name of bastions, retained until our days. As for country forts, we see them still employed at the beginning of the 16 th century, as we have said above, these are actual blockhouses suited to contain a post and artillery. H Here (5) is one of these works of wood enclosed by a ditch a and a palisade, represented in the Recit des actions de l(emperear Maximilian I. [1] Yet the name of bastile ceased to be applied after the 16 th century to isolated or flanking works; henceforth they have the name of bastion, and in certain cases of rampart. (Arts Bastion, Boulevard). Perhaps alone the Bastile S. Antoine retained its name until the day of its demolition. It is unnecessary to recall that this fortress served as a state prison from the epoch of its construction until the end of the last (18 th) century, aud commanding a populous suburb, connected with the arsenal by walls and gates, it remained the visible sign of the royal sovereignty in the centre of Paris from the reconstruction of the old Louvre.

Note 1. p. 175. Recit de roi sage, by M. Treitsaurwein, engraved by Haunsen Burgmoyr. Vienna. 1775. p. 144.

BASTION. Bastion. Fort.

A projecting fortification, adopted after the 16 th century to flank the walls and prevent approaches by cross fire. (Art. Architecture Militaire). The words "bastide, bastille, bastillon," explain the origin of the bastion. Most old enclosures to be strengthened at the end of the 15 th century, when siege artillery had acquired great power of destruction, were surrounded by bastions of earth turfed and faced with masonry, w when time and resources permitted. In the last case several stories of fire were given to the primitive bastions, so as

attributed the incredible success of the armies of William t the Conqueror in the midst of a country always ready to revolt, the success of a conquest odious to the Gaulish and Saxon peoples of Great Britain. To these means the Normas again had recourse, when they invaded French soil in the 14 th and 15 th centuries. When Edward besieged Calais, he surrounded his lines by forts; he placed them at the passes. (Art. Architecture Militaire). Finally when the city of Orleans was invested in 1428, count Salisbury placed forts "at the side of the Beausse." [1] The citizens of Orleans and the Maid (Joan of Arc) at their head were compelled to attack these forts and set f fire to them, in order to raise the siege. The organization of the Anglo-Norman armies, their tendency during the middle ages, was devoted to these works, on the contrary in France the constabulary disdained them, and the undisciplined infantry recruited from all sides, never suspected their utility; it would further have been incapable of executing them. Country forts or those of besiegers were crowned by a platform to permit the establishment of casting machines, thus being able both to command the country and to batter the towers of the besieged. It is to be believed, that it was the same for the permanent forts, and that the great Bastile S. Antoine in all ages had its towers covered by platforms. Under Charles V cannon were already in use, and it is possible that from their origin these platforms received some mortars. Besieged and b besiegers at the beginning of the use of artillery preferably placed their guns for attack and defense on elevated points, and in the positions assigned to casting machines; in substituting cannon for stone-throwers, machines casting projectiles by a counterpoise, only the motive force was changed, retaining the position of the engine. The first mortars did not throw projectiles directly, but in a parabola like stone-throwers; there was they an advantage in dominating points to be battered, and it was only in the 15 th century that artillery was placed near the ground, and that the advantage of a sweeping fire was recognized. (Art. Architecture militaire). The fort being an elevated and isolated work, then became the defense appropriate for artillery. During the wars of the 15 th century, the old walls of the middle ages soon appeared unable to resist cannon; forts or bastions were built around these walls,

Charles IX, shows the Bastile S. Antoine with its surroundings. With the aid of this plan we have endeavored to give a cavalier view of this fortress (4), taken from the south side. At A is seen the top of gate S. Antoine, at B are the walls of the c city, at C the bridge of the Bastile thrown across to Rue S. Antoine, and at D is a great earthwork entitled the (bastillon" (bastion) on the tapestry in question, a work that probably dates from the end of the 15 th century. This bastion is a quite high terrace commanding the exterior and flanking the old walls of Charles V. In the same plan deposihed at the City Hall is seen a great bastion nearly similar to this, built beside and outside the gate of the Temple. But letsus return to this sort of works.

Note 1. p. 173. The tower G was called tower of the well, tower H the chapel, I the treasury, K of accounts, O the Bazinière, N the Bertaudière, M that of liberty, L the corner; P Q were puildings of a quite recent epoch, but which replaced an old barrack. D was the great court, E the court of the well, R was a guard room, S the storerooms. The gates A, C, F were walled up long before the Bastile was demolished.

During the 14 th and 15 th centuries occurs frequent mention of bastions in earthwork, dry stone or wood built by armies to protect their camps and batter invested walls, to cut communications or hold the country. The Anglo-Normans appear to have especially adopted this system during their wars, and it even seems that among them this habit came from the North rather than by Roman tradition. In the great invasions of the western continent in the 9 th century, the Normans chose an island in the river, a promontory, a place defended by nature; there they established camps fortified by actual blockhouses, left garrisons there and ascended the rivers on their boats to pillage the country, attack open cities and monasteries, r returned to deposit their booty in these camps, or sometimes wintered there. Later, when the Normans were established in the northern provinces of France and went to conquer England, they covered the country with forts; they no sooner took possession of a city or market town, than they erected detached works, solidly built military posts, by means of which they held the inhabitants. It was in great part due to these precautions, to that salutary interest in war, that must be attrib-

also designated sometimes by the word "bastide", like bastide S. Denis, [1] bastide S. Antoine. We shall occupy ourselves more particularly with the latter, tat especially retains the name of Bastile.

Note 1. p. 170. Hist. des exped. maritt. des Normands, by M. Depping. Paris. 1844.

Note 1. p. 171. This curious relief was mentioned to us by M. Didron during his sojourn at Modena, we believe it unpublished; the courteous communication of M. Didron is thus of great interest.

Note 2. p. 171. In the extracts from the accounts printed in the memoir of Bouquet, there is a question of the towers on the walls of Paris, of the ditches "filled with water outside the gate S. Denis in France (p. 176)." See Dissert. archaeol. sur les anc. enceinte de Paris, by Bernoudet. 1852.

Note 1. p. 172. Memoir of Bouquet and Jour. de Paris sous Charles VI. 1429.

From the time of king John, or even before that epoch, there existed at the entrance of Rue S. Antoine a gate flanked by two high towers; Charles V resolved to make of that gate a strong fort. About 1369, that prince gave orders to Hugues Aubriot, provost of Paris, to add to these two towers a considerable work, composed of six other towers connected together by thick curtains. Henceforth it appeared that the Bastile w was no longer a gate, but a fort protecting gate S. Antoine erected toward the northern suburb. The Bastile of S. Antoine always retained its old entrance; in the new portion three o other gates were pierced on the two axes, so as to be able to enter or leave the fort by four bridges throwu over the moats. That was an actual isolated fort, closed at the gorge, commanding the country and city afar, independent of the city walls but strengthening them. The name of Bastile in particular given to that post clearly indicates what was understood by a fort in the middle ages. We give here (3) the plan of the Bastile S. Antoine. The two towers H I depended on the primitive gate A. At B opened a gate on the side next the arsenal on t the south; at F was the gate opposite Rue S. Antoine, and at C the gate on the north side connected with the walls of Paris (the present boulevards). [1] The great tapestry of the City Hall representing a birdseye view of Paris as it existed under

the enclosures of the abbey of S. Denis, in order to protect the monastery from a sudden attack, the same prince in 866 caused the erection of a little fort, that sufficed to prevent the Normans from taking possession of that post thereafter. At the same epoch the bridges situated before the mouths of the Marne and the Oise at Charenton and at Auvers, were likewise furnished with forts. [1] Yet if the texts mention works of this sort during the Carlovingian epoch, if some vignettes of manuscripts represent towers, we know no monument, that g gives so clear an idea of the construction of an offensive t tower as the text of Cesar describes. We are reduced to state simply, that these works were generally built of wood, that they preferably took the square form, that they were in several stories with a platform for the use of machines, and with battlements to protect the soldiers. One of the clearest representations of the temporary towers erected outside the walls of a strong place is found carved on the arch of the north d doorway of the cathedral of Modena. It is a relief from the 11 th century giving the history of Artus of Brittany.(2). [1] The two towers represented in this relief are evidently of w wood and in several stories. We cannot state if they belonged to the city, or if they depend on a siege enclosure; but this point is of moderate importance; they served as refuge for th the soldiers, either to defend or to attack the city. For if the besiegers erected towers along their lines, also frequently the besieged constructed them outside the walls, when the walls did not present a very strong defense, at distances to protect those walls, keep the assailants away from them or take them in flank or rear, if they presented themselves for the assault. In that case these towers were surrounded by palisades and ditches; they were connected with the barbicans of the gates, or surmounted them. Sometimes even the gates and the towers formed but a single structure behind a barbican; such were also erected to command a bridge-head, a defile or a passage, as Charles the Bald did in the 9 th century. The walls of Paris, commenced under king John and completed under Charles V, were defended by forts connected together by a curtain and double ditches with a wall between them. [2] These forts had the form of a parallelogram in plan, with its longer side facing the exterior. The principal gates of Paris are a

give first (1) a perspective section of the tower or fort described by Cesar, at the moment when the Roman soldiers were occupied in building it higher under cover of the movable roof. That was raised at the four angles by means of wooden screws, that successively engage in great split nuts held by the first lateral beams of each story, and in the angles of the tower; in that manner these screws are endless, for when they leave the nuts in a lower story, they are already engaged in the n nuts of the last story completed; holes bored in the body of the screws permit at least six men to turn each of them by means of levers, like a capstan. As fast as the roof rose, t the masons blocked it up at several points and leveled it. At the ends of the beams of the roof are suspended the mats of cables to shelter the workmen. As for the building or gallery to allow the pioneers to mine under cover the walls of t the besieged, his description is sufficiently clear and detailed to require no commentary.

Note 1. p. 169. Cesar. De Bello civ. Book 2, Chaps. 8, 9, 10, 11.

To protect the work of the miners, to possess an important fort near the walls attacked, well equipped and suited to contain a numerous post for covering the parapets with projectiles, and taking in flank the detachments attempting sorties, such was the function of the Roman fort, that we see employed with less powerful means, it is true, at the sieges of Alesia and of Bourges. There were only earthworks in horseshoe form with ditches and palisades, a sort of barbicans designed to permit troops to make sorties in mass on the flank of the assailants thrown against the lines. It is unnecessary to state, that these forts were equipped with casting machines suited to batter the towers of the place besieged, or to sweep the ditches of the enclosing lines.

This system was likewise applied from the first times of t the middle ages by besieging and besieged armies to batter t the ramparts and to defend weak points, or rather did not cease to be employed; for to vanquish an enemy is to instruct him, and the Romans by subjecting the barbarians taught them the art of war. Charles the Bald, to prevent the Normans from ascending the Seine, built two forts at Pistes at the two ends of a bridge, probably Pont-de-l'Arche, actual fortresses. In

defend the works near it, they began to construct a structure (musculus,=little mouse) [1] 60 ft. long with beams 2 ft. square, that led from the ground story of the tower to that of the enemy and to the walls. They first placed on the ground two sills of equal length and 4 ft. apart; they were set in mortises made in these sills posts 5 ft. high. These posts were connected by cross-pieces in form of low gables for placing on them purlins to support the roof of the structure. On these were set rafters 2 ft. square, connected by pins and bands of iron. On these purlins were nailed strips 4 fingers square to support the bricks forming the movering. This carpentry being thus arranged and with plates resting on the crossbeams, the whole was covered with bricks and wet clay, to have no fear of fire cast from the walls. On these bricks were stretched hides to prevent the water directed into the gutters by the besieged from wetting the clay; that the hides might not be changed by fire or stones, they were covered by wool mattresses. All that work was done at the foot of the tower under the shelter of mantlets, and suddenly when least expected by the citizens of Marseilles, by the aid of pulleys used in the navy, the building was pushed against the tower of the city, so as to join its foot."

Note 1. p. 168. Isodorus. (See Latin text).

The besieged were frightened by this rapid maneuvre and brought forward by levers the largest stones they could find, and dropped them from the top of the wall on the structure. But the carpentry resisted by its solidity, and everything t thrown on it was cast off by its slopes. On seeing this, the besieged changed their plan, set fire to hogsheads filled with pitch and tar, and cast them from the top of the parapets. These casks rolled, fell to the ground at each side of the b building, and were pushed away with poles and forks. Meanwhile our soldiers under cover in the building broke with levers t the stones of the foundations of the tower of the enemy. Besides the structure was defended by arrows shot from the top of of our brick tower; the besieged were driven from the parapets of their towers and their curtains; they were not left time to show themselves to defend them. Already a great quantity of the stones of the substructure were removed, and a portion of the tower fell suddenly."[1] To illustrate this passage we

made the height of a tower."

"When the fort had been built to the height of one story, they (the Romans) built a floor composed of beams with ends covered by the external surface of the masonry, so that fire cast by the enemy could not catch on any projecting part of the carpentry. Above this floor they raised the brick walls as much as permitted by the parapets and shields by which they were covered; then at a little distance from the top of the walls, they placed two beams diagonally to lay on them the f floor destined to become the roof of the tower. On these two beams they placed transverse beams extending to each side, w with their ends projecting a little beyond the external surf-aces of the tower, so as to be able to suspend outside guards to protect the workmen engaged in building the tower. They c covered this floor with bricks and clay so as to be proof ag-ainst fire, and placed above it rough coverings, for fear that the roof might be broken by projectiles cast by the machines, or that the stones thrown by the catapults might crush the b bricks. Then they made three mats with the cables serving to anchor vessels, the length of each side of the tower and 4 ft. high, and attached these to the outer ends of the beams of t the roof along the walls, on the three sides struck by the enemy. The soldiers had often found in other conditions, that this sort of protection was the only one offering an impenet-rable obstacle to the arrows and projectiles thrown by the m machines. A part of the tower being finished and sheltered from all attack, they transported the mantlets used there to other points of the works of attack. Then supporting it on t the first floor, they began to raise the entire roof in one piece, and elevated it to a height so that the mats of cables could still protect the workmen. Concealed behind that protec-tion, they built the brick walls, then raised the roof again, and thus secured the space necessary to raise gradually their structure. When it had attained the height of a new story, th they built a new floor with beams with spans always covered by the external masonry; and then they continued to raise the roof with its mats. Thus without incurring danger or exposing themselves to any wounds, they successively erected six stor-ies. Slots were left at places suited for placing war machines."

"When they were assured that from this tower they could de-

themselves under the necessity of making a regular siege, their first care was to establish inner and outer enclosing lines, reinforced at proper distances by towers of wood or even of masonry. It was easy to reect the towers of the outer enclosure, it will be understood that the besieged endeavored to prevent the establishment of towers of the inner enclosure, to destroy those works built opposite the ramparts of the place, often at a very little distance. Yet the Roman armies attached the greatest importance to these works, that we may compare to our siege batteries and our places of arms. To erect opposite the towers of a besieged city other and higher towers to dominate the fortifications, to prevent the defenders from remaining in the galleries, and thus to protect the work of the miner, was the slow but sure means practised by the Roman armies, with as much method and perseverance as skill. We cannot occupy ourselves in detail with the bastion, without having first indicated the origin of this work according to antique statements. It must be first understood, that mediaeval armies never presented a body as disciplined and h homogeneous as the Roman armies, and that consequently the means of a regular attack employed by them could not rival t those employed by the Romans.

When the lieutenant C. Tribonius was left by Caesar at the siege of Marseilles, the Romans must erect considerable works to reduce the city, which was strong and well equipped. One of their works approaches an actural fort, and is of great importance; we give here the translation of the passage of C cesar's commentaries, which describes it, endeavoring to make it as clear as possible.

"The legionaries, who carried on the works at the right, j judged that a brick tower built at the foot of the wall (of the city), could be of great assistance to thec against the frequent sorties of the enemy, if they could succeed in making it a fort or redoubt. What they first built was small and low; yet it served them as a retreat. They defended themselves there against superior forces, or emerged to repulse and pursue the enemy. This work was 30 ft. on each side, and the thickness of the walls was 5 ft.; they soon recognized (for experience is a great teacher), that by means of some combinations great aid could be derived from this structure, if it were m

antiquity, sought new arrangements of plan and a new system of construction; it must be stated to many persons occupying themselves with the religious arts, that Romanesque and pointed churches are the only ones that were truly Christian.

Note 1. p. 165. If S. Peter of Rome has retained its name of basilica, it is unnecessary to state, that the actual arrangement of the edifice in nowise recalls that of the primitive basilicas.

If that cannot be sustained throughout, since in the Christian city in particular, there exists not one church built a according to Romanesque or pointed principles, we are indeed forced to recognize, that Christianity in the West has invented a new form, that has marvellously been applied to the ne needs of worship. One can adopt or reject this form, but it no less belongs to Catholicism; good or bad, it is the work of that.

BASSYE, an old word employed for latrines. (Art. Prive).

BAS-RELIEF. Relief. (Art. Imagerie).

BASTARDE. An old word used to designate a piece of wood of average size.

BASTIDE. Bastion. Bastile. Fort.

By bastide (bastion) was understood in the middle ages an i isolated defensive work, but forming a part of the general s system of fortification. One should distinguish permanent bastions of the place from those erected temporarily; bastions belonging to the fortifications of a place from those forts builts by the besiegers to strengthen an enclosing inner or outer line. The word bastion is rather employed until the end of the 13 th century to denote temporary works designed to p protect a camp, than structures for permanent occupation, it is only by extension after that epoch, that by bastion or bastile are designated forts of masonry joined to an enclosure. The word fort is frequently applied to a detached house, built outside the walls of a city. [1]

Note 1. p. 166. Ducange, Gloss.

When the Romans invested a strong place, and found themsel-

the forms of Romanesque architecture, the resumed the profile of the antique base; during some time still, the system of b bases applied at the end of the 15 th century found itself mi mixed with the profile of the Roman base, which produced a s singular confusion; but from the moment that the orders were regularly adopted, the last traces of the profiles of the bases of the 15 th century disappeared. (Art. Profil).

BASILIQUE. Basilica. Church.

Among the Greeks and Romans in antiquity the basilica was a hall longer than wide, frequently with side aisles and galleries above them, terminated by an apse at the end opposite t the entrance. There was justice rendered, that related to commercial affairs as in our modern exchanges. Among the edifices surrounding the forum, the basilica occupied one of the foremost places. Vitruvius described it, indicating its use and dimensions.

Antique basilicas sometimes possessed double side aisles; such was the Emilian basilica, whose plan is traced on the marble fragments of the great plan of Rome made under Septimus Severus. When the Christians could perform their worship publicly, they utilized the antique basilica as better suited to the gatherings of the faithful, than any other edifice of paganism, the first churches they erected adopted this form. Properly speaking, there is no basilica in France after the 10 th century. (Arts. Architecture, Architecture Religieuse).

This name was applied to some primitive churches of Rome, such as S. Peter, [1] S. Maria Maggiore, S. John Lateran, which are three great Christian basilicas of the first order. S. L Lorenzo, S. Agnes, S. Paul-w-t-W and several other churches of the antique city also retain the name of basilica. In France some of our churches obtained fhom the Pope the privilege of being designated as basilicas, but from the architectural point of view, that name cannot be given to them. The plan a and general arrangement of the antique basilica might suit christian churches: but these monuments should only be regarded as the appropriation of an antique edifice for a modern need, not as the realization of a determined programme; this is so true, that the constructors of the middle ages, from t the moment they abandoned the degenerate traditions of antiq-

architects affected to profile the bases of the same pier at different levels, as if to better separate each little column or member of these piers, and to avoid continuity of horizontal lines. Here (44) is an example of the base of a pier of the 15 th century taken from the nave of the cathedral of Meaux. These examples are very common, and we do not think it necessary to multiply them; besides it is with the bases of the 15 th century as with all details and architectural entireties of that epoch, the complication of forms attains monotony. More originality, more art; all is reduced to the formulas of the stonecutter. At the end of the 15 th century, the piers, instead of being composed of groups of cylindrical columns, return to the monocylindrical form or to groups of curvilinear prisms. In the first case a single base with a polygonal plinth bears the great cylinder (45), in the second one recovers the principal base, that of the body of the pier, i into which penetrate the little partial bases and projections of the prisms grouped around this pier. One receives with difficulty an idea of the confusion resulting from that design, but the stonecutters of that time made a play of these penetrations of bodies. (Art. Trait).

We give here (46) the base of a pier taken from the portico of mansion de la Tremoille at Paris; this example confirms wh what we state. 1. One sees in section the principal profile D of the base of the pier, expressed in D' in the plan P. The projecting bases of the prisms attached to this pier penetrate into the moulding P so that the projecting angles A E F G C H of the plinths fall on the circumference of the curve of the lower base. The engaged column B has a special function and bears the springings of the transverse arch and of two diagonal arches, possesses its distinct base. The small surfaces I remaining between the moulding D' of the base and the depths of the recesses are cut inclined, as indicated by the section T'. Thus men came in the 15 th century to give each member of the pier its independent base, while leaving beneath the body of the pier a principal base designed to receive the penetrations of the secondary bases. (Arts. Pilier, Penetration).

Note 1. p. 103. This construction dates from the last years of the 13 th century.

When at the beginning of the 16 th century men returned to

moulding. Let A (41) be the profile of a base of the end of the 13 th century; the scotia D is still visible; it is no m more than a curved line, the ancient moulding of the pedestal E belongs to the plinth and detaches it, as if there were a joint at F, but which does not exist. The base is again modified; the scotian B entirely disappears, the profile E is reduced and its upper member is detached. Then finally about 1230, the two toruses C unite and the profile E vanishes in the plinth. The little supports under the projections of the lower torus are retained when the plinth with square plan permits, which is rare. The plinth became polygonal to better c circumscribe the toruses. No longer understanding the art reasons, that induced the architects of the middle of the 13 th century to use the same height and the same base moulding under all columns, whatever their diameters, and tending to subject all architectural details to an imperious logic, the constructors of the 14 th century returned to bases of unequal heights by reason of the diameter of the columns united in o one pier. One can see an example in the cathedral of Paris, whose apsidal chapels were constructed from 1325 to 1330; the piers at the heads of these chapels are set on bases cut thus. (42). Yet here the enequalities in the heights of the bases are little apparent, and the toruses are moulded at the same level. The eye is brought to a single horizontal line from w which the piers rise. During the entire duration of the 14 th century, this method is preserved without sensible variations. Only at the end of that century and the beginning of the 15 th, the architects thought of emphasizing the bases, not keeping either toruses or plinths at the same level. But let us first say, that the two toruses of the base, after the omission of the scotia, were so strongly united, that men ended by forgetting the origin of that moulding; from the two mouldings was formed only a single one during the 15 th century; and as that moulding was cut in the same stone as the plinth, it was no l longer separated from that by a strong cut at a right augle, a cut that for thinkers of that epoch only indicated a bed, that had never existed. From the profile A they came to the profile B, and the member G that replaced the ancient torus, instead of being on a circular plan, took the polygonal form of the old plinth D, the column remaining cylindrical. The

of the pointed period, to avoid projections of importance to disagree with the vertical system of the structures. In advancing pointed architecture multiplies its vertical lines and effaces its horizontal members; the latter are reduced more and more to disappear entirely in the 16 th century. Such is the force of a logical idea carried to an extreme in the arts, that it ends by smothering its own origin.

During the first years of the 14 th century, the piers still posses the bases with uniform heights and mouldings. Not only columns forming groups are subdivided (Art. Pilier), but they commence to bear projecting angles intended to multiply verti - cal lines. The profiles of the bases follows the contour given by the plans of these piers, and in this case the plinth retains its square plan, whose projecting angle is covered by the projection formed by the lower torus of the base. In the choir of church S. Nazaire of Carcassonne (39), the engaged p piers present in horizontal section A combinations of little columns mostly having projecting edges; the profile of the b base follows these edges, and the projections of the lower toruses are also accompanied by little supports. The horizontal surfaces are again accompanied by little supports. Horizontal surfaces are carefully avoided here, for the square plinths of the bases penetrate a continuous moulding dependent on the base circumscribing the plan of these plinths. Yet a curious fact must be mentioned here, the choir of church S. Nazaire of Carcassonne still retains the great lylindrical columns, and exceptionally the architect of that edifice not having accepted the polygonal plinth under the toruses of the bases, he was led then to form claws to cover the projecting angles of the plinths, that the toruses of the bases of the great columns could not conceal. (40). These examples indicate perfectly the transition from the base of the 13 th to the base of the 14 th century, for the plinth with square plan and the claw are not found again after this last epoch. At S. Nazaire of Carcassonne, we again see beneath the plinth the moulding B (40), that represents a course under that plinth, although in fact that moulding B is cut in the same course as the base. That was a nonsense not often repeated. Indeed soon the moulding B of the torus and the plinth were only one; the two torus mouldings of the base likewise only formed a single

genius), what leads us to admire so much our French architects of the 13 th century is that they have followed this path, as the Greeks passed over it in their temples; but unfortunately this way is never long in the history of the arts. Taste, genius and instinct cannot be formulated, and the hour of pedants, of reasoners, soon succeeds the inspiration possessed by science, but holds this prisoner and subjected.

Before passing farther and showing what becomes of this so important member of pointed architecture, the base, we should not omit an observation in detail with its importance. If the bases of the piers of the ground story executed from 1230 to 1260 present but little variety in the composition of their profiles and plans; if architects during that period attach great importance to these lower bases, the point of departure, the module of their edifices; it seems that they frequently left the execution of the bases of the secondary columns of the upper ranges to the stonecutters. The workmen from different workshops, collected in great numbers when it was necessary to construct a vast edifice (and in that epoch men built with a rapidity almost prodigiousSArt. Construction)), allowed themselves to modify certain profiles of details according to their tastes. It is not rare (and that may be observed particularly in great monuments) to find in edifices dating from 1240 to 1270, bases of little columns, mullions of windous, upper galleries, presenting rows of diamond points in the scotia, bases with scotia, with upper torus of circular section, with simple square plinth or one with angles cut off and with supports under the projection of the lower torus. There is still in that epoch a certain liberty, but it takes refuge in the parts of edifices out of view, and is produced without the participation of the architect.

At the beginning of the 14 th century the base became poorer, its mouldings lost in height and projection. Already in church S. Urbain of Troyes, which opens the 14 th century, the bases of piers and of little columns scarcely count; the two toruses are connected and the scotia has disappeared (38); the mouldings of the plinth are little; everywhere in the ground s story as in the upper galleries, the profile is the same. One sees that then the architects sought to disguise this architectural member, so important in the edifices of the first time

Note 1. p. 154. Beginning of the 13 th century.

When as in the great churches the edifices are composed of rows of isolated piers and of piers attached to the lateral walls, the bases are at different levels, those of the great isolated piers being higher than those of the piers of the side aisles: that is very well reasoned, for a single height for the bases of short and of tall piers would be shocking; this level would have been too high for the piers of the side aisles or too low for the isolated piers, which ascend to the great vault. Then for the great piers, the base generally consists of three members:-- 1, of a lower plinth circumscribing the polygons; 2, of a second plinth with mouldings; 3, of the proper base with its plinth; while for the piers of the side aisles the base only consists of two members; 1, of a plinth of the height of the step; 2, of the base with its plinth. If the side aisle be double, the second row of isolated piers is borne on bases with heights the same as those of the engaged piers, since the second row of piers has only the height of those attached to the lateral walls. However large t the edifice, the bases with the greatest height never exceed and rarely equal the height of the eye, in the monuments constructed by French artists in the 13 th century, i.e., 5.3 ft. The height of the base is then the true module of pointed architecture; it is the point of comparison of the scale; it is like a horizontal line traced at the foot of the edifice, that everywhere recalls the human stature. If the floor rises by some steps, as in the choirs of churches, the level of the base rises as much, forming a second level line indicating a different floor. These rules are very far from those, that one wo would base on the Roman orders, and which are rarely confirmed by facts; but let us not forget, that it is necessary to study antique and pointed architecture from two different points of view.

By thus assigniug to all piers aud the members of these piers a single profile of the bases, without taking account of the diameters of the columns, architects obeyed their artistic instinct rather than a reasoning of learned men; they had deviated from the logical track. We cannot say too frequently (because in the arts and especialy in the art of architecture, between pure science and imagination a way is open to men of

are their profiles, while retaining the same mouldings as members.

Note 1. p. 151. How many edifices, whose internal effect is destroyed by a pile of chairs or benches concealing their bases, appear a hundred times more beautiful when this furniture is removed.

From the first attempts of the architecture of the 12 th c century in the provinces of France, until about 1285 when piers were composed of groups of columns of unequal diameter, the junction of the bases gives different profiles because of the diameters of the columns; at least this is common; i.e., the great column has its base and the small column also, the profiles being similar but unequal. This fact is very remarkable at the cathedral of Laon, [1] where some piers of the nave are composed of great cylindrical columns, flanked by detached columns of small diameter. (37). A gives the profile of the great central column and B is that of the little shafts, all resting on a plinth of the same height. But already from 1230 to 1240, we see the piers composed of columns of unequal diameter with the same profile of the base of the columns independently of their dimensions. It is certain, that whatever the composition of the pier, the architects wished it to have its base and not its bases; there was a question of unity. At S. Chapelle of Paris (Fig. 34), the three columns of the engaged piers and the little colunms of the arcade have the same profiles of the base, which continues between these little columns along the foot of the hangings; excepting that the profile applied to the shafts of the arcade and extending along the wall is flatter than that of the great columns. The architects of the 13 th century, artists of taste at least as much as scrupulous logicians, had felt it necessary in their edifices composed of so many different members, successively produced by the principle to which they were subjected, to connect these members by great horizontal lines, the more accented because more rare. The base placed nearly at the level of the e eye more than the ground itself, was the actual starting point of their arrangement; they sought so much to avoid projections in that line and changes of level, that they frequently connected bases of piers engaged to walls by a course continuing the profile of these bases, as may be seen in S. Chapelle of Paris.

these details are subject to rules dictated by good sense and taste; besides for example in Normandy, where the last Romanesque period was so brilliant and beautiful, it is seen that the pointed school is hesitating and undecided; it mingles i its Romanesque profiles with the new system of architecture; its mouldings are often traced by chance, or effects are sought, in which exaggeration plays a greater part than taste. The profile of the base given here (Fig. 35) is an example of this; it is a Romanesque profile, the scotia is unskilfully filled by beads, that again weaken the profile, already too f flat for a pier of this diameter. Not thus proceeded the masters, architects like Robert of Luzarches, Pierre of Corbie, Pierre of Montereau, and so many others from the schools of Ile-de-France, Champagne, Picardy and Burgundy; they gave nothing at hazard, and they took into account effects, that they wished to produce in their general composition as in the traces of the smallest profiles, like skilful practicians as they were.

One should not be surprised, that we enter on considerations so extended relating to bases. The bases, their composition and profiles in edifices have an importance at least equal to that of the capitals, they give the scale of the architecture. Those placed on the ground being near the eye became the point of comparison, the module which serves to establish proportions between the mouldings, the group of columns and the ribs of the vaults. Too delicate or too heavy; they will cause the upper members to appear heavy or lean. [1] Thus the bases are treated by the great masters of works in the 13 th century w with a care and a very special love. If they are placed very near the ground and are viewed from above downward, their profiles are flattened, their least details lend themselves to t that position.(36 A). If on the contrary, they support columns above like those of high windows or triforiums, and if consequently one can see them only from below upward, their mouldings, toruses, scotias and fillets will be higher (36 B), so that by perspective effect the profiles of these lower and higher bases will appear the same. This study of the effect of the profiles of bases is very evident in the nave of the cathedral of Amiens, built from 1225 to 1235 in one inspiration. There the nearer the bases are to the vault, the higher

adopted everywhere, except for some little columns of mullions, octagonal plinths and blocks. At the cathedral of Amiens in the lower parts of the choir, at S. Chapelle of Paris, in the nave of the church of S. Denis, in the choir of the cathedral of Troyes, etc., all bases of engaged or isolated columns are so cut (34). Yet some provinces took another method in the s same epoch. Normandy, Maine and Brittany placed the bases of their piers, columns or little columns, isolated or engaged, on circular plinths and blocks concentric with the torus. Such are the bases of the piers of the nave of the cathedral of S Seez (35), the bases of the columns of the part of the church of Eu dating from about 1240, of the choir of the cathedral of Mans of the same epoch, etc.; for it is to be noted, that in the first years of the 13 th century these details of Norman architecture differ very little from those of the architecture of Ile-de-France, and that in the moment when in the dioceses of Paris, Rheims, Amiens, Auxerre, Tours, Bourges, Troyes and Sens, the lower plan of the base passed from the square to t the octagon, the circular base was adopted in Normandy and M Maine. This latter form is soft and poor, for from producing the still stable effect of the base on an octagonal plinth. Also the English architects adhered to the circular base at the same epoch. The enfluence of the French style makes itself felt in Normandy at the end of the reigh of Philip August, l later the Anglo-Norman style seems to prevail in that province, in details if not in the entirety of the construction.

Note 1. p. 148. Base from the church of Notre Dame of Semur, from Notre Dame of Dijon, etc. Also see (33) the drawing of a base from the cathedral of Leon, beginning of the 13 th century.

Yet the profile of the base suffered modifications from 1220 to 1240. The lower torus A (Fig. 34) was flattened; the scotia G was hollowed and sometimes extended to the line of the column, the upper torus B, instead of being drawn with compasses, was flattened to make its profile lighter and more refined. The purpose of these changes is very apparent; the architects desired to give more importance to the lower torus at the expense of the other members of the base, so as to stop the column by a broad moulding, visible as much as possible. But this is only in the mother provinces of pointed architecture, that

that the abacuses of the capitals were frequently set in that epoch according to the direction of the arches of the vaults, the front B of the abacus being perpendicular to the diagonal A; hence the bases assumed in plan a position similar to that of the capitals; the second, that the bases so placed presented oblique sides not interfering with passage. Already from 1230, the direction and number of the arches of the vaults n not only determined the number and size of the columns, but the position of the bases. (Art. Construction). Omitting the corner-leaves on the bases of isolated piers, they could not be left on the bases of engaged columns and little columns of galleries, windows etc. The architects of the 13 th century adhered to strongly to unity of style to commit a like fault; but we must not forget their aversion to all uncovered horizontal surfaces supporting nothing. The corner-leaves being r removed, the angle of the square plinth again became apparent, plain, contrary to the principle of offsets and transitions. To avoid that danger, the architects commenced to make the l lower torus project considerably beyond the plinth (31); [1] but the angles A, in spite of the bevel C, still left a horizontal surface visible, and the projecting torus B (although the bevel C was not continued beneath the projection at D) w was weak and easily broken; if the base were viewed from beneath, it allowed a horizontal surface to be seen. They scarcely hesitated to avoid these two inconveniences by recessing the corners and arranging a little support under the projection of the torus. Fig. 32 A indicates in plan the angle of t the plinth disguished by a recess, and B is the support left beneath the projection of the lower torus. Fig. 33 gives the base of an engaged pier from the cloister of the cathedral of Verdun cut on this principle. It is evident that the projecting angles, against which it would be dangerous to strike the feet in a gallery intended for walking and passage, have been avoided by the oblique sides of the lower courses P. All these experiments succeed each other with incredible rapidity; in the same structure built in ten years, advance and improvements appear at each stage. From 1235 to 1245, the architects took the part of avoiding complications in cutting the plinths and blocks of the bases of secondary columns, as they had already done for the great columns of the naves, i.e., they ad-

of the ground story; these cut-off angles are not found on t the bases of the engaged columns of small diameter. The intention to not obstruct passage is here evident. [1] Around the c choir of the cathedral of Chartres (beginning of the 13 th c century), the great columns that form the enclosure of the s second aisle rest on bases with cubical blocks and a regular octagonal plinth. (27). But the position of these columns accompanying a step justifies the presence of the paneled square block. Indeed these steps prevent passage in all directions a and it would be useless to cut off the angles of the square block. There the corner-leaf descends from a course; it precedes the base whose plinth in the reach of the hand is frankly octagonal. Already even the lower torus of this base, to protect by its curvature the edges of the polygon, to avoid the projection of the obtuse angles, extends beyond the faces of the polygon, as indicated at A on a profile taken perpendicular to the middle of one of these. In such a fine course of reasoning the architects of the 13 th century no longer stopped. At the cathedral of Rheims (28) we see retained the square plinth with its lorner-leaves, but passers are kept from the edges by the first course B of the plinth, cut on an octagonal plan, the lower torus C projects beyond the faces D.

Note 1. p. 146. These bases of the cathedral of Paris must have been cut and set in place between the years 1175 and 1180.

At the same epoch was built the nave of the cathedral of Amiens and an innumerable number of edifices with the bases of the great piers moulded above octagonal plinths and blocks. The corner-leaf then disappeared. Here is an example of this kind of base with octagonal plinth taken from the cylindrical columns of the side aisles of the choir of Notre Dame of Semur in Auxois. (29). While everywhere from 1230 to 1240 the a angles of the plinths and blocks of the great piers were cut off, to allow easier passage around these isolated piers, there were still retained bases with square plinths and blocks for columns angaged at the walls, for the little columns of the windows, arcades, and all those removed from the circulation; excepting for engaged columns when triple (which often occurred for supporting the transverse and the two diagonal pointed arches of the vaults), the bases were set as indicated in Fig. 30. There were two reasons for this; the first, t

their edifices were built. [1] These reasons and those no less imperatively deduced from the new system of construction adopted from the beginning of the 13 th century, successively induced architects to modify the bases.

Note 1. p. 142. The profiles of the church of Montreal are of a purity and very remarkable beauty, and their execution is perfect. In this monument all the bases and mouldings within reach of the hand are polished, while the facings are simply cut in almost rustic fashion. This contrast between the cutting of the mouldings and the facings is frequent at the end of the 12 th and beginning of the 13 th centuries; it lends a very particular charm to the details of the architecture. (Art. Taille).

Note 1. p. 144. How frequently do we not see in our modern edifices these cornices and stylobates present their sharp c corners at the height of the eye? Those edges of pilasters or of bases, that are cursed with reason, when the crowd forces you against them?

In Ile-de-France it is necessary to study these transformations followed persistently. The architects of that province did not delay in recognizing that the square plan of the plinth was objectionable beneath the lower torus, although its angles were rounded and rendered less dangerous by the presence of corner leaves. If they retained the square plinths for the bases of columns out of reach, they cut off the angles o for the great columns of the ground story. For example, the cylindrical columns around the choir of the cathedral of Paris (end of 12 th century); those of the nave of the cathedral of Meaux, around the choir of the church S. Quirace of Provins, whose bases are elevated on plinths and blocks of octagonal plan with four large and four small sides. Yet as if to retain its character of strength in the base, a considerable projection beneath the shaft of the column, the constructive again recoiled from the octagon with equal sides, they retained the corner-leaf, but gave it less importance since it covers a smaller surface. Fig. 26 bis indicates the plan and the cut off angle with its corner-leaf for one of the bases around t the choir in the cathedral of Paris, cut on this principle. B But it is to be noted well, that these bases with irregular octagonal bases are only set under the great isolated columns

profile much more appropriate for that place, because instead of forminga a cutting angle, it presents a round. Placing aside these few exceptions, the base deviates no farther from the rational form given to it by French architects of the 12 th century; it could perfect that by the abuse of the logical principle, that determined its composition.

Note 1. p. 141. This choir is unfortunately destroyed, the bases alone remaining in place as indicated in our drawing.

One of the most beautiful and last examples of the base of the 12 th century is found in a little church in Burgundy, t the church of Montreal near Avallon. [1] We give here (25) one of the bases of the engaged columns of the nave of that church and its profile A at half full size. The blocking out indicated by the dotted line is still entirely respected here. The piers of this church sometimes present polygonal pilasters i instead of engaged columns; these pilasters do not stand on a base profile repeating that of the columns; they have their special base (26), whose composition supports our theory explained by Fig. 21 bis. It is rare except in monuments erected under Roman influence, like the cathedrals of Langres and of Autun, also many edifices in Charolais and of upper Burgundy, that pilasters (common in these structures during the 12 th century) rest on profiled bases similar to those of the columns. The true French architecture then arising did not admit that the same profile of the base could suit a rectangular pilaster and a cylinder. And in that as in many other things the new school was right. The toruses and fillets of bases, small and isolated, presented at the square returns points d disagreeable to the eye, and especially discordant at the height at which they were placed; for it is rare that the upper level of bases from the 12 th century exceeds 4.0 ft. above t the pavement. The projecting angles of the bases of pilasters were then joined at the height of the hips or elbows of a man; and if mediaeval architects had always in view the human scale in their compositions (Art. Architecture), if they held that a base was rather proportioned to human dimensions than to th that of the edifice, one should not be surprised, that they carefully avoided those corners with sharp edges, that menaced one passing. Taking into account human dimensions, they must naturally think of not obstructing or injuring men for which

going farther. But first let us observe that the quality of the materials, their greater or lesser hardness, influences the profiles of the bases. When the architects of the 12 th century employed marble or compact limestone of strong nature, they did not sink the scotias of the bases; they multiplied sharp edges and planes to obtain vivid and narrow shadows and effect at little cost. In Languedoc, where marbles and cold compact limestones almost alone are found, one finds many profiles of bases cut in the 12 th century with great care, great delicacy of curvature, but where the deep hollows so f frequent in the North are avoided.

We will take as an example one of the bases of the twin columns of the gallery of the second story of the city hall of S. Antonine near Montauban.(22). The stone employed is so compact and hard that it splits under the chisel, unless cut with very light blows without sinking the tool. Now the profile A of th this base shows with what skill the stonecutters have avoided sinkings, the members of the mouldings projecting, as if they utilized the fineness of grain of the stone to obtain by light chiseling clearly cut planes and sharp edges, though little accented. Antique traditions, where they were alive as in Provence, retained their influence still at the end of the 12 th century, while allowing the introduction of innovations. Among a great number of examples that we could cite, one is very remarkable, the bases of the piers around the choir of the church of S. Gilles. (23). The corner-leaves are attached to the tower torus of the Roman Ionic base; their sculpture recalls antique sculpture. This base is returned between the piers to form the base of an enclosure, rests on the floor of the choir and is raised only at A beside the side aisle. It is to be a assumed that the columns bear the fillet and the opophyge like the antique column. [1] In the choir of the church of Vezelay a little later than that of S. Gilles (last years of the 12 th century), we find again the Roman tradition, but only in the shaft of the column, that bears at B a torus, fillet and cavetto.(24). As for the base itself, apart from its corner-leaves that are well characterized and have nothing antique (Art. Griffe), its profile is that of the end of the 12 th century; the block that raises this base at the side aisle is not crowned by the antique quarter-round at at S. Gilles, but by a p

horizontal lines, to never let the former rest abruptly on t the latter without an intermediary. To make ourselves understood by a fig. (20), let A A be two horizontal courses of a structure and B a vertical support; the constructors never leave the angles C C void, but fill them by inclined projections D D, transitions that are shoulders, reinforcements, slopes, when the horizontal line is left to reach the vertical line; corbels when the vertical line is left for the horizontal. All is logical in the architecture of the middle ages, dating from the great school of the 12 th century, in the entirety as in the least details; the principle that led the architects t place on the cylindrical column a capital reduced below to support the different members of the structure above, to multiply corbellings to pass by a succession of projections from the vertical support of the vault, naturally brought them to proceed in the same manner, when it was necessary to place a slender vertical support on a wide base. Thus aside from st steps, footings in the substructures of edifices must necessarily present horizontal surfaces, but let us always regard the horizontal surfaces as excluded and not acting.

Indeed, let (21) A be a column and B a course serving as f footing or base. The entire weight of the column rests only on the surface C D. However strong be the stone course B and however little the surface C D sinks under the load, the ends C F, D G are not loaded and cannot follow that movement, and the stone being inelastic will break at E E. But if (21 bis) between the column A and the footing B is placed a course O, the chance of rupture exists no longer, for the load will be distributed over a much larger surface C D. The angles E may be chamfered off as useless, hence more visible horizontal surface. Such is the principle determining the forms of all bases of the pointed period. [1]

Note 1. p. 132. This principle properly understood not only applies to bases but to the entirety and details of structures of the middle ages from the 12 th century. (Art. Construction).

Let us now see how when this law is once established, the a architects do not vary from it, but ever apply it to its last results without ever deviating, with a rigor of logic never carried as far in the arts in any epoch; so that finally each experiment, each new attempt in this way is only a step for

without its new member, the corner-leaf, and architects appear to be left to the most singular caprices. Thus we see on the bell tower of Ebreuil columns with capitals and bases of identical form (16). The same occurs at the doorway of the church of Neuvy-S.Sepulchre, at the church of Casset, that again allows us to see a base with form and sculpture belonging to a capital (17).[1]

Note 1. p. 136. The two last examples belong to the 12 th century. To M. Millet, architect, we owe the drawings of these two bases.

The same where Roman traditions had retained more power, at langres, for example, but where the French schools of art penetrated, we see in the 12 th century the antique base adopt the corner leaf. The bases of columns around the choir of the cathedral of Langres have finely sculptured corner-leaves (18). The profile A of these bases is almost Roman, except the scotia, that seems only roughed out, the plinth (see plan B), instead of being square in plan is bent according to the angle of the polygon on which stand the columns of the choir. There is a refinement denoting particular care on the part of the constructors of that edifice.[2] This care in the details is carried very far in the detals of the bases of the little columns on the triforium of the cathedral of Langres. The little twin columns resting on bases cut in a single block of stone, when very heavily loaded carry the load to the two ends of t this stone, and rarely fail to break it at the middle, where it is weakest, since at that point it has only the depth of the plinth. To avoid this inconvenience, the constructors of the choir of the cathedral of Langres had the idea of leaving between the twin columns a reinforcement on the plinth, taken in the height of the base course (19). That is very ingenious, and this principle is likewise applied to the capitals of this triforium. (Art. Chapiteau).

Art. 2. p. 136. The choir of the cathedral of Langres opens a wide field to the study of construction during the 12 th c century; we shall have occasion to return to it in Arts. Construction and Voute.

There already results from these examples given a remarkable fact; the increasing tendency of the architects of the 12 th century to establish transitions between vertical and horiz-

We believe it is unnecessary to insist on the merit of this innovation, so conformable to the principles of good taste and with an appearance so reassuring to the eye. When one is familiar with this appendage, whose appearance and reality present such stability, the Roman base with its isolated plinth has something disquieting; it seems (and this occurs but too frequently) that its thin corners will break at the least movement of the structure or the first shock. About the beginning of the 11 th century are seen to appear the first corner leaves on the angles of plinths; they first present themselves as very simple but actual reinforcements, to soon take forms borrowed from the plant or animal kingdoms. (Art. Griffe).

It would be difficult for us to say in what part of the West this innovation originated, but it is incontestable that it is seen to be adopted almost without exception in all French provinces, after the first half of the 12 th century. On the banks of the Rhine as in Provence and north Italy, bases of columns are nearly always from that epoch and during the first half of the 13 th century, and are furnished with corner-leaves.

We represent (14) one of the bases of the columns of the n nave of the church of Rosheim near Strasburg (left bank of t the Rhine), which is reinforced by very simple claws (1 st half of 12 th century); and (15) a base of the engaged columns of the church of Schelestadt of the same epoch, which presents the same peculiarity, although one of these two profiles strongly projects, and the other but little. But one will note that in these two examples, as in all those that we can take from Rhenish monuments, taste is entirely lacking. The bases of the columns of the church of Rosheim are ridiculously flat and heavy, those of the church of Schelestadt on the contrary being too plain, and their claws are poor in section.

Always in Ile-de-France or the adjacent provinces is it necessary to seek beautiful examples of mediaeval architecture, either in entirety or details. While in these provinces the centre of the arts and the intellectual movement was in the 12 th century, the base is subjected to reasoned rules, like all a architectural members, but anarchy or old traditions yet reign in the central provinces, which but slowly follow the impulse given by the artists of the 12 th century. In Auvergne, Berry, Bourbonnais and a part of Poitou, the base long remained with-

by cutting a cylinder E F, then he hollowed out the scotia C and its two fillets, contenting himself by rounding off the angles of the two disks A, B, without seeking to give otherwise any swell to its profile by recessing B or by rounding it. Yet this profice is heavy, and can only suit bases belonging to columns of small diameter; but this system of cutting is employed during the course of the 12 th century and remains always apparent; it dominates the cutting of the profile.

Note 1. p. 132. This base comes from the church of Ebreuil.

Let (12) a block of stone O be intended for a base:-- leaving the height A B for the plinth, a primary cylinder A C is cut as in Fig. 11, then a second cylinder E D; the recess D E D is obtained. 2, the scotia F is hollowed. 3, the two angles G H are chamfered. 4, the fillets I K L M are chiseled. 5, the f first torus, scotia and second torus are rounded. Sometimes even, as we shall see soon, the base remains cut according to the 4 th step. The profiles of bases of the 12 th century, due to this simple mode of cutting, whose principle is always felt, retain some firmness, that is perfectly suited to this solid architectural member, and it must be confessed, that it contrasts with the softness and undecided form of most profiles of Roman bases. The lower torus, instead of being cut in a semicircle and leaving between it and the plinth a horizontal surface, that always appears ready to break under the load, rests on and seems compressed on this plinth. But the architects of the 12 th century go farther, observing that in spite of its spread, the lower torus of the base left free the four angles of the square plinth, that these angles of small depth spalled easily if the base settled slightly; the architects strengthened the corners by a little diagonal projection starting from the lower torus and strengthening that projecting angle. This appendage is now termed claw (corner-leaf), (Art. Griffe), becomes an ornamental motive,and gives to the base of the 12 th century a character, that distinguishes it and separates it entirely from the Roman base.

We give (13) the profile of one of the bases of the cylindrical columns around the choir of the church of Poissy, and according to the procedure indicated by Fig. 12, and the drawing of the corner-leaf at the angle of that base leaving the lower torus to strengthen the projection of the square plinth.

the giving of great delicacy to the profiles; it allows the edges and fillets to be multiplied; and the turners of bases applied this possibility. The turned base B is composed of o one course and rests on a plinth with eight sides inscribed about its diameter.

In the North, in Normandy and Maine, already from the 10 th century the stonecutters had abandoned the corrupt Roman mouldings, and applied themselveu to execute delicate profiles w with small projections, with a soft and refined swell. Naturally bases yielded to that new influence. By the refinement of the swell and the slight projection, norman profiles are distinguished during the Romanesque epoch. (Art. Profil).

Here is one of the bases of the piers of the internal arcade of the nave of the cathedral of Mans (10) 10 th century, that rather approaches the profiles of the oriental period, than those adopted by the Romans of the West. However, we could m multiply examples of bases preceding the 12 th century without finding a general method or the application of a principle. An antique monument still standing, a fragment badly understood, the taste of each stonecutter influenced the form of the bases of a monument, without its being possible to recognize among all these examples, with their execution frequently very careless, a dominant idea. But as we have already stated, we shall place the Cluniac monuments outside this chaos.

In provinces where hard limestone is common, stonecutting attains rare perfection about the beginning of the 12 th century. Cluny was the centre of provinces abounding in hard stone, and the artizans attached to its establishments soon took the greatest care in profiling the bases of the edifices, whose construction was entrusted to them. This architectural m member near the eye, was one of those that they treated with the greatest love. It is easy to see in the cutting of the profiles of bases the application of a regular method; they proceeded by successive planes to pass from the cube to the moulded circular form.

As the principle of the method applied in the 12 th century, we give one of the bases so common in the edifices of the centre of France and the Charolais (11). [1] As Fig. 11 indicates, the two disks A and B are exactly inscribed in the square plan of the plinth D. From the point E the stonecutter commenced

Pilier). In countries where antique monuments remain standing, the Roman base persists and is preserved more pure than in the provinces in which these edifices have been destroyed. In Southern France, on the banks of the Rhone, the Saone and the Rhine, is found the profile of the antique base until about the first years of the 13 th century; innovations appeared earlier in the vicinity of the great art centres, such as the monasteries. Yet until the 11 th century the religious only followed Roman traditions, allowing them to become extinct gradually, but when in that epoch the rule of Cluny had formed schools, taken up the study of letters and arts, it introduced a new elements of architecture among the last remains of Roman arts. In the details as in the entirety of architecture, Cluny opened a new way (Art. Architecture Monastique); while chaos still reigns over the area of the West, Cluny establishes rules, gives certain forms to the workers in its establishments, and improves the execution belonging to them. In its monasteries we see the base freed from Roman tradition, adopting new profices and an original ornamentation. The bases of the engaged columns op the nave of the abbey church of Vezelay furnish a prodigous number of varied examples; some still recall the antique base, but already the profiles no longer suffer from the sterile influence of the decadence; they are traced by hands that seek new and frequently beautiful combinations; others are covered by ornaments (5) and even by figures of a animals (6). At the same epoch (toward the end of the 11 th century), elsewhere ignorance and barbarism admit nameless forms, confused and without any definite character.

The bases of the piers belonging to the Romanesque nave of church S. Nazaire of Carcassonne (end of 11 th century) denote the forgetting of Roman traditions and the most profound scorn for form, the poorest invention; (7) is one of the bases of the cylindrical piers, and (8) is a base of the engaged columns of that nave. All rest on a circumscribed square plinth.

Besides in Berry and in Nivernais were frequently made turned bases, i.e., moulded on a lathe, this method was likewise applied to columns. (Art. Colonne).

We give (9) the profile of one of the bases supporting the columns around the choir of church S. Etienne of Nevers, which is cut by that procedure (11 th century). The lathe invites

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this moulding is omitted in the Romanesque epoch. The apophyge and bottom fillet of the shaft of the column required for being retained a cutting away for the entire height of the s shaft; by omitting these members the stonecutters saved considerable labor. Thus to avoid this cutting away to be done f for the length of the shaft, the astragal was joined to the capital instead of retaining it on the column. (Art. Astragale).

We give some of the varieties of bases adopted from the 7 th to the 10 th centuries. Fig. 1 is one of the bases found in the substructures of the collegiate church of Poissy; a s structure appearing to belong to the Merovingian epoch. [1] F Fig. 1 bis reproduces the profile of most bases of Carlovingian arcades, still visible in the crypt of the abbey church of S. Denis in France (10 th century). There is found in these two profiles a rude imitation of the Roman base of the later time. Fig. 2 gives one of the bases of the polygonal piers in the crypt of S. Avit at Orleans; it is a simple bevel ornamented by a coarsely chiseled line (7 th or 8 th century); Fig. 3 are the bases of the piers of the crypt of S. Etienne of Auxerre (9 th century). Here the piers are composed of a square mass with 4 engaged half columns, the base being merely a bevel resting on a circular slab. This fact is interesting to note, for it is an invention introduced into architecture by the middle ages. The idea of placing piers composed of columns on a first course presenting a single layer for the different projections of the plan of these piers, does not cease to dominate in the composition of bases of the Romanesque and pointed periods.

Note 1. p. 126. Below the floor of the church rebuilt in t the 12 th century, these bases were discovered in their original places; around them were found numerous fragments of capitals and abacuses of the rudest work, with fragments of Roman tiles. It is not doubtful, that these remains belong to the church built at Poissy by the first Merovingian kings. T The bottoms of these bases are 2.0 ft. below the pavement of the church of the 12 th century.

We find another example in church S. Remy of Rheims. The piers of the nave of that church date from the 9 th century; t they are formed of a cluster of columns, (4) with their corrupt Roman beses resting on a low circular course. (Art. Pili-

pier. The Greeks in antiquity only placed a course forming a base under the columns of the Ionic and Corinthian orders; t the Doric order had none. Under the empire the Romans adopted the base for all their orders, and that tradition was retained during the first centuries of the middle ages. The Tuscan order, which is merely the Doric modified by the Romans, was v very rarely employed during the late empire; they they gave the preference to the Corinthian and Composite orders, as being richer. With some variations of little importance, the b bases applied to the columns of these orders were composed of a bottom tablet or plinth, a torus, one or two scotias separated by an astragal, and a second torus; the shaft of the column carried the fillet and apophyge. Frequently the base was set on a pedestal, plain or decorated by mouldings. Nothing equals the rudeness of the bases of columns belonging to edifices of the Merovingian and Carlovingian epochs, in profile and cutting. There are still found the members of Roman bases, but executed with such imperfection, that it is impossible to define their form or draw their profile. Their proportions w with regard to the diameter of the column are entirely arbitrary; these bases are sometimes very high for columns of small diameter and low for great columns. Sometimes they are composed of a bevel, sometimes one sees a series of motives superposed without a reason. It would be difficult for us to give a complete series of bases from that time of barbarism; for it seems that each stonecutter was guided only by his fancy or a very vague tradition of forms adopted during the late time. We can only mention peculiarities presented by certain bases of the Carlovingian epoch, and we shall especially endeavor to explain the transition from the corrupt Roman base to the base definitely adopted at the end of the 12 th century and during the pointed period.

A very remarkable detail distinguishes the antique Roman b base from the mediaeval base of the early time; the Roman column has at its lower end a projection composed of apophyge a and fillet, while the mediaeval column, except some rare exceptions to be considered, has no lower projection and is set directly on its base. Thus on the antique column between the upper torus of the base and the shaft of the column is a moulding dependent on the latter and serving as a transition. T

and large timbers, to locate in England where they pleased, when they had taken some land, for the nobles to lodge and retreat at night, to avoid the dagger of surprise. Thus it could be taken apart like a crownwork and assembled again. great n numbers of carpenters worked on it." Froissart. Book 3,p.498.

As for bars properly so-called, they were wooden timbers th that served to close and strengthen the leaves of doors, that were desired to be closed solidly. The external gates of towers, isolated defensive works, when closed by a single leaf, frequently have wooden bars sliding in the thickness of the wall. In case of surprise, by closing the leaf and drawing t the wooden bar, it is kept firmly shut and gives time to bolt it. "ere (2) is one of the gates of the towers of Carcassonne, closed by this simple means. At the side opposite the bar is made a square hole in the jamb of a doorway to receive the end of the bar when entirely drawn; the door is then strongly barricaded. To draw the bar a ring was set in its end, and to return it to its place a deep mortise in its bottom allowed it to be withdrawn from the hole it entered. (3).

Gates with two leaves for fortresses were barricaded by a pivoted wooden bar, just as practised today in many cases. This was pivoted on an axis and entered two holes made in the masonry jambs of the gate.(4), When the leaves were closed. Socetimes as at gate Narbonne of the city of Carcassonne, the bar of the two leaves was fixed horizontally to one of the t two leaves, striking against the other and being fixed at its end by a strong pin passing through two large iron eyes.(5). The two leaves thus formed a single rigid closure, while one had time to push the bolts and to place other movable bars in square holes out in the jambs.

BART. Rubble. Paving.

An old word employed for rubble and paving.

BAS-COTE. Side Aisle.

The name given to the side aisles of churches. (Arts. Architecture Religieuse, Cathedrale, Eglise).

BASE. Base. Plinth.

This is the name of the enlarged lower end of a column or

related to me the manner of the assault, and the monks still kept it as a trophy." [1]

Note 1. p. 121. Les Chroniques de Froissart. Book 1. p. 78. Edition Buchon.

The barriers were a post of honor; there were the selected men of the garrison in time of war. "At gate S. Jacques (of Paris) and at the barriers were count S. Pol, viscount Rohan, lord Raoul de Couroy, lords Sempy, Cresques, Oudart de Renty, Engmerran d'Eudin. Now on this Tuesday morning (Sept. 1370), that they (the English) moved out and set fire to the villages in which they had been lodged, while they clearly saw Paris. A knight in their march had vowed the day before, that when he came thus to Paris, he would strike the barriers with his lance. He did not fail but left his troop sword in hand, shield at his neck and armed at all points; and he came spurring his courser, his squire behind him on another courser, carrying his helmet. When he neared Paris, he took his helmet and placed it on his head; his squire laced it behind. Then they came using their spurs, and came in full course to the barriers. These were open; the lords there asked him to enter, but he had no wish for this. And when he had struck the barrier as he had vowed, he drew rein and returned. When the knights of France saw him retreat; "Go, go away, you have done bravely." [1]

Note 1. Froissart. Book 1, Part 2, p. 618.

It is unnecessary to state that around camps were established barriers. (Arts Lice, Enclosure). [2] In tournaments was also the combat at the barrier. A barrier of about 5 ft. divided the lists. The combatants were placed at the ends on the right and left, rode their horses against each other with lances in rest, seeking to unhorse each other; the barrier separating them prevented the horses from striking each other, thus making the combat less dangerous by leaving to the combatants o only their lances to overthrow each other. These barriers in tournaments were covered by bright or painted fabrics, and w were entirely boarded on both sides, so that the horses or c combatants could not injure themselves against the posts or cross beams.

Note 2. p. 122. In 1386, when was a project of an expedition into England, "the constable of France, Olivier de Clisson, caused to be constructed the enclosure of a city, all of good

and large timbers, to locate in England where they pleased, when they had taken some land, for the nobles to lodge and retreat at night, to avoid the dagger of surprise. Thus it could be taken apart like a crownwork and assembled again. great n numbers of carpenters worked on it." Froissart. Book 3,p.498.

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about half a foot apart); and then he caused all his men to arm themselves, and each to go into watch-towers, provided with stones, lime and such equipment belonging to the defense. And however soon those lords came to Honnecourt in order of battle on the great road and with many men, these placed themselves between the barriers and the gate of the said city in good agreement, caused the gate of the city to be opened behind them, and showed and carried out well that manner of defense.

There came Jean of Hainault, Henry of Flanders, Farkuement, Berghes and others, who dismounted and approached these barriers, which were very strong, each with sword in hand; and they commenced to deal great blows at those within; those of Honnecourt defended themselves valiantly. There was the abbot, who did not spare himself, but kept the entire front in good agreement, and received the blows very valiantly, returning as great blows and strokes very expertly. There were done many fine feats of arms; and those in the watch towers cast down stones and benches, pots filled with lime to further annoy t the assailants. There were the knights and the barons before the barriers, who performed marvels of arms, and as Henry of Flanders was quite in front with sword in hand, and dealt great and dangerous blows, the abbot, who was strong and bold, caught the sword of the said Henry, and striking and pulling it toward him, so that between the palisades of the barrier he came even to the arm of the said Henry, who would not leave hold of his sword for his honor. Then when the abbot held the arm of the lord, he pulled him so strongly as to pull him within the barrier up to the shoulder, and there did him great injury, and doubtless would have pulled him inside, if the b barrier had been open enough. The said lord Henry was not at ease while the abbot held him, for the latter was strong and rude and pulled without sparing him. On the other hand the k knights pulled against him to rescue lord Henry, and that struggel and pulling lasted very long, so that lord Henry was sorely hurt. However he was rescued by force, but his sword remained to the abbot by his great prowess, who kept it for many years, and I believe that it is still in the hall of Honnecourt. It is still there while I am writing this book; and it was shown to me one day when passing there, and there was

troops to gather to throw themselves on the works and machines of the assailants; once taken, the besieged could not make s sorties in compact masses through the narrow gates of the defenses in masonry; compelled to file through these exits, they were easily driven into the interior. In all descriptions of the sieges of the 12 th, 13 th and 14 th centuries, are constantly combats at the external barriers of the strong places; they are taken and retaken desperately, often losing many men, which proves the importance of these advanced works. To prevent the assailants from setting fire to them, like the sheds and towers, they were externally covered by fresh hides, even by mud or manure.

Note 1. p. 119. Barriers with counterpoises are still in use in Austrian Tyrol.

Suburbs of cities were defended by simple barriers, and frequently even the streets of these suburbs before the gates. The attack then became very dangerous, for men occupied the buildings around the combatants, and the assailants found themselves stopped in front, taken in flank and rear. Froissart gives an account of an attack on this sort of barrier, and h his tale i too curious, for us to not give this passage at length. The king of England is camped between S. Quentin and Peronne. (1339).

"Now there came thus Henry of Flanders, with his new nobility, and to advance his men and increase his honor, he placed himself one day in the company of several knights, of whom J John of Hainault was chief, and there were Fouquemont, Berghes; Baudresen, Kuck and severe others, so that there were f fully five hundred combatants; and having seen a city near t there called Honnecourt, where the greatest part of the country belonged to that fortress and had placed all its goods therein. And there had already been Arnauld of Blakehen and William of Duvort and their troops; but they had done nothing; then suddenly all these nobles had a great desire to come there and cause their men to conquer it. Then was in Honnecourt an abbot of great sense and boldness with many valiant men at arms; and so it appeared there, for he caused to be made outside the gate of Honnecourt in great haste a barrier placed across the road; and there might be between one side and the other about half a foot of space (i.e., the piles were spaced

of slates used in the same places (Art. Ardoise); the wood b being cut more easily than slate, the ends of wood tiles set along rakes of gables, sills or corner posts sometimes have worked drops and even perforations.

We saw at Honfleur in 1831, [1] a wooden house on the harbor, whose plates were covered by wooden tiles cut in form of a l lambrequin (2). Many windmills are seen in France, that are entirely covered by wooden tiles. In Germany tiles of fir are still used, especially in Bavaria near the Tyrol. [2]

Note 1. p. 118. We give this date, because daily there ~~dis~~- appear the remains of the coverings of houses, and the house mentionel may have lost its tile ornaments, or may have even been demolished.

Note 2. p. 118. The tiles nailed on half timber walls preserves them perfectly from external dampness, and theiruse f for isolated structures exposed to wind and rain cannot be t too strongly recommended. Soaked in a solution of alum before setting, they become incombustible.

BARRE, BARRIERE. **Barrier**. Gate. Outwork.

From the earliest middle ages until our days it was customary to place before the defensive works of cities or castles, such as gates, wooden palisades with movable parts for passage of troops. But particularly during the 11 th, 12 th, 13 th and 14 th centuries barriers play a great part in the art of fortification. The opening parts of these barriers are composed of open gates swinging on hinges; of rising gates (Art. Architecture Militaire; Fig. 30); or of simple wooden poles drawn horizontally like our forest barriers, or rising by means of a counterpoise (1), pulled down by a chain. These kinds of b barriers only serve to prevent a body of cavalry from abruptly forcing a passage. They were also built on the roads, either to collect a toll or to prevent a post from being surprised by mounted men. [1] When an army came to lay siege to a fortress, there scarcely occurred a day without a skirmish at the barriers, and the besiegers attached great importance to taking them, for the external defenses being once in their power, they prevented and obstructed greatly the sorties of the besieged. These barriers were often very advanced and extensive, being actual barbicans, that allowed a large body of

forming an inclined plane favoring the loading or unloading o of the materials. Carting expresses the transportation of the stones to the building, and the laborers for this work are te termed in the yards carters. By extension men are said to cart stone on the scaffolds, i.e., to bring them by planks and wooden rollers to the machines for hoisting and setting them. There terms are very ancient. The transfer of stones from the ground to the point of setting was often formerly done by means of wooden inclined planes. The cylindrical keep of Coucy, built of very large cut stones from base to top, was erected by means of a spiral inclined plane supported along the external surface by cross beams and ties inserted in the masonry. (Arts. Construction, Echafaud).

ARBDEAU. Wooden tiles. Shingles.

This name is given to small tiles of oak, chestnut or even fir, formerly employed for covering roofs and even walls of houses and of structures built with economy. In wooded countries the wooden tile was particularly used. This mode of covering is excellent; very light, resists the wind, and when wood of good quality is employed, lasts for several centuries. Sometimes the tile coverings were painted reddish-brown or d dark blue, probably to imitate the colors of clay tiles or slates. These dark grounds were relieved by horizontal lines or lozenges painted white.

The wooden tile is always longer than broad, with ends square, triangular, octagonal or rounded; it is generally held on the sheathing by a single nail. Here are the most common forms of wooden tiles employed for coverings in the 15 th and 16 th centuries. (1). Their length rarely exceeds 8.7 ins. or width 3.2 ins. The lower end is often beveled as indicated by Figs. A to give less hold for the wind and facilitate the escape of water. The tiles were split and now sawn, so that the wood was straight-grained; this mode of making is necessary for their preservation. Sawing allows the use of defective wood, while crossing the grain requires the use of sound wood with regular layers and without knots. The saw frequently cuts across the fibres; after a little time and exposure to rain, there occur splits and cracks through which water enters. When placed on vertical surfaces like walls, tiles take the forms

of the curtains of the outer enclosure by two gates, that can be closed. By taking the postern or the two curtains, the besiegers could not at once enter the gallery of the projecting work, and found themselves attacked at the side on entering the barriers. Being open at the gorge, that barbican was itself commanded by the internal enclosure. We give(2 A) birdseye views of the exterior and (2 B) of the interior of that defensive work. Until the invention of firearms, the form given to barbicans from the 12 th century was scarcely modified, still being often established on a semicircular plan; yet toward t the middle of the 15 th century, they were only regarded as flanking the outer gates; it was sought to flank themselves, either by other works erected before them, or by the form of their plan. The barbican defending the principal entrance of the castle of Bonaquil, erected in the 15 th century near Villeneuve d'Agen, is a first attempt in that sense. (Art. Chameau). Pieces of artillery were placed in the ground story and the upper parts retained their battlements intended for archers and crossbow men. On losing their ancient form at the end of the 15 th century by the adoption of a new system suitable for firearms, these works lost their ancient name to take the name of bulwark. When the barbicans of the middle ages were r retained, they were strengthened externally in the 16 th and 17 th centuries by works of great importance. Thus the exterior of the barbican A (3) of the suburb of Sachsenhausen of Frankfort-o-M was protected at the beginning of the 17 th century, about the same epoch the barbiman A of the castle of C Contempre of Cambray (4) became the occasion of the construction of a crownwork B of great extent. (Art. Boulevard).

BARD. Cart.

This is a cart with two wheels on whose axle rests a bed a and a pole with two or three cross-pieces. This cart was employed from time immemorial in construction yards, and serves to transport cut stones to the building; it is also termed binard. Six or eight men are attached to this cart, and move it by by pushing against cross-bars, and putting on collars attached to iron straps fixed on the front of the bed and the p pole. When the stones are loaded or discharged, the pole is raised, the rear of the bed lowered to the ground, thus form-

and there was a great assault by Turks, who saw clearly that we were going to ower to the host of the duke of Burgundy, w who was on the other side. And as they entered the said barbican, the Turks struck the rear of our host, and did so much as to capture lord Errant de Vallery. But he was rescued at o once by lord John his brother. But neither the king nor all his men moved, untill all the arms and armor was carried over. And then we all passed after the king, save lord Walter de Ch-astillon, who formed the rear guard in the barbican. When the entire host had passed over, those remaining in the barbican and being the rear guard had great difficulty with the Turks, who were mounted. And they could come directly, for the barbican was not high. And the Turks on foot cast great and hard stones against their faces, and the rear guard could not defend itself. And they would all have been lost and destroyed, if it had not been for the count of Anjou, brother of the king, who was since king of Sicily, who strongly rescued and brought them into safety." 2

Note 2. p. 112. Hist. du roy S. Loys, by De Joinville. Edit. of Dufresne Du Conge. 1678. Paris.

That barbican was evidently only a work with palisades, since mounted men could pass over it. In the situation in which the army of S. Louis found itself at this time, having lost a great part of its supply of wood, camped on a ground where earthworks of any importance could not be undertaken, all that could be done was to erect a palisade serving as a bridgehead, sufficient to stop the hostile army, and allow the retreating army to pass in order with its equipment. The birdseye view given here (1) will make intelligible the utility of this work.

One of the most important barbicans of masonry was that protecting the castle and city of Carcassonne, and which was built by S. Louis. (Art. Architecture Militaire; Figs. 11, 12, 13). That much advanced barbican was closed, being an isolated work. But mose frequently barbicans were open at the gorge a and formed an outwork, a semicircular projection attached to the outer enclosures or barriers. Thus were constructed the barbican erected before gate Narbonne at Carcassonne (Art. Porte), that of the castle of the side next the city, and that protecting the south postern of the outer enclosure of the same city. The latter barbican is connected with the gallery

antique order should exclude the use of all these members. Fa facades are then only superposed structures. (Art. Ordre).

BARBACANE. Barbican. Outwork.

During the middle ages by this word is designated an advanced fortified work that protects a passage, gate or postern, and that permits the garrison of a fortress to gather at a p projecting point under mover to make sorties, to protect a retreat or the entrance of assistance. A well fortified city or castle was always equipped with barbicans, simply built of wood like the outworks of Roman camps, or of earth with ditch, of stone or rubble with movable bridge, wide ditch and outside palisades. (Art. Architecture Militaire). The most common form given to barbicans was the circular or semicircular with one or more entrances masked by the curve of the works. The armies that camped took care to erect before the entrances of the camps vast barbicans, that allowed the troops to combine their movements for attack, retreat or defense. At the time of a s siege, outside the walls of fortresses were frequently built barbicans, that were only temporary works in which was lodged a surplus garrison.[1]

Note 1. p. 111. Roman du Renord. Vol. 2. p. 327. (Old French Poem).

But most frequently barbicans were permanent works around well fortified fortresses.[1]

Note 1. p. 112. Roman de Garin. (Old French Poem).

Among temporary barbocans, one of the most celebrated is th that which S. Louis caused to be erected to protect the retreat of his army corps and to pass a branch of the Nile after the battle of Mascoura. Lord de Joinville speaks of that work in these terms:--"When the keng and his barons saw the affair and that there was no other remedy (the camp was a the prey of pestilence and famine), all were agreed, that the king should cause his host to pass over the land of Babylon, to the host of the duke of Burgundy, who was on the other part of t the river flowing to Damietta. And to withdraw his men easily, the king caused to be built a barbican before the bridge previously mentioned. And it was made in suce manner, that one c could enter well enough at two sides on horseback. When this barbican was built and ready, all men of the host took arms;

continue around all projections of the construction, for example buttresses. This method persists until the end of the 12 th century; but when the system of pointed architecture is developed, these secondary horizontal members never become bands. That is very evident at S. Chapelle of Paris; only the moulding just mentioned, that indicates the floor of the upper chapel, passes around the edifice, over the faces of the walls as well as the buttresses. At the cathedrals of Amiens, Rheims and Chartres the window sills of the ground story form belts, but without ornaments. (Art Chapelle); from this belt the buttresses rise vertically without offsets or horizontal breaks on the sides, their fronts alone having drips, that prevent rain from running down their surfaces exposed to it. It could not be otherwise; when one examines the structure of edifices in which the pointed system is freely adopted and followed, the entire construction only being composed of buttresses between which windows open for the entire height of the stories, there were no walls, the belts indicating the horizontal rest; the edges were opposed to this vertical snstem; their effect would have been injurious; their projecting profiles on the sides of the buttresses would have awkwardly intersected the jambs of the windows with neither use nor reason. (Arts. Architecture Religieuse, Contre-fort). From the 13 th century in religious architecture, the belt no longer actually exists, the solid walls being suppressed; they are found only as in the last example just given, only when they are the horizontal extension of the window sills; but their profiles are modified according to the taste of the moment. (Art. Profil).
In secular architecture, where the walls are necessarily retained, or the construction only consists uniquely of buttresses leaving grat openings between them, belts indicate the l levels of the floors. (Arts. Chateau, Maison). Sometimes the belts are then decorated by sculptures, particularly during the 15 th century. Composed of simple mouldings cut in one low course during the 12 th, 13 th and 14 th centuries, on t the contrary they assume a height and strong projecteon of the 15 th century, and intersect facades horioontally with ornamentation more or less rich. In the 16 th century belts lose their appearance of a line to become real entablatures with architrave, frieze and cornice, even when the absence of an

corbels beneath the bases of the upper little columns. (10).

Note 1. p. 108. We have frequently heard praise or blame of the arrangement of the great belt of thecathedral of Amiens by competent persons. But truth compels us to add that the pr praise was given by amateurs of Gothic architecture at its c climax, and the blame by enthusiasts for the Romanesque style. As in both cases contradiction occurred between the tastes a and judgments of each, we do not well know what decision to give. We shall only say, that the mode adopted at Amiens is frank, that it denotes an intention well deciden on, that this interior of a nave appears to us to be the most beautiful specimen we posses in France of the architecture of the 13 th c century, that we could with difficulty take into account the effect produced by that interior, if deprived of this rich b band of foliage vigorously undercut, whether it would gain or lose; and taking the matter as beautiful, executed by artists as good connoiseurs as ourselves, and more familiar with grand effects, we can only approve that boldness of the architect of the nave of Amiens.

During the 13 th century external belts are scarcely more t than mouldings with drips and without ornamentr; for the architects of that epocn evidently feared to destroy the effect of vertical lines by giving the horizontal lines of their architecture too great importance, and sculpture would have occupied the eyes and have given too great value to the bands. Yet one still sees sometimes bands with ornaments in that epoch; but this is where it is desired to indicate the floor of a gallery. Thus on the exterior of S. Chapelle of Paris,exists a great band decorated by leaves and crockets at the level of the floor of the upper chapel.

However pleasing may be the Romanesque architecture of Poitou and the provinces of the West, it must be admitted that it is not so scrupulous , and its monuments are sometimes covered by sculptured belts, whose places are determined only by the taste or caprice of the artist, and not by a story or a definite architectural arrangement. During the Romanesque period many horizontal members of the architecture with very secondary functions, like the imposts of the archivolts, the abacuses, the capitals of engaged columns, window sills, or the low railings of crowning arcades, became actual bands, i.e., they

forming a drip. It is unnecessary to state, that these architectural details present great variety in both profiles and in ornamentation, we only pretend in this Article to give their general arrangement. Yet we cannot pass over in silence the internal bands serving as bases for the trifoliums of the churches of Autun, Beaune and Langres; their ornamentation is too much impressed by Roman traditions for us not to reproduce one of these examples. Here is the belt extending around t the choir of the church of Beaune at the height of the floor of the galleries over the side aisles.(8). The same belt with little difference is found again at the cathedral of Autun; at Laogres the rosettes are replaced by a scroll evidently c copied from antique fragments.

In the 13 th century belts became more rare in architecture than in the Romanesque period. Already in that epoch architects seemed to exclude the horizontal line, and they gave it only a relatively secondary importance. Yet the architect of the cathedral of Amiens thought that he must very vigorously emphasize the height of the floor of the triforium in the enterior of the nave by a high belt richly decorated by strongly projecting leaves; this belt assumes the greater importance in the architectural arrangement of the interior by passing bedore the groups of columns, intersecting them at about the middle of their height.(9). A indicates the section of this band with the base of the triforium. Evidently here the master of the work desired to break the vertical lines dominating in that nave, whose construction dates from about 1230. (Art. A Architecture Religieuse, Fig. 35). There is as it were here a last memory of Romanesque architecture. [1] Without having such great importance, it nearly always occurs that bands in edifices of the beginning of the 13 th century, pass before the c clustered piers, and serve as rings to maintain their shafts set edgewise. (Art. Bague). Also sometimes bands are rounded like baskets, and supported by a corbel, serve as support for clusters of little columns only starting above the columns of the ground story between the archivolts. This arrangement is particularly adopted, when the piers of the ground story are cylindrical, but are not composed of a combination of columns to support the upper vaults. The interior of the church of Notre Dame of Semur in Auxois presents these bands forming cor-

the architectural arrangement placed above B will be destroyed by the loss of this space B C. Decorating the band by sculptures especially in the interior, architects adhered to presenting ornaments on a surface perpendicular to the visual ray; they did not easily reject inclined planes E F, and contented themselves with gradually diminishing the projections E B. S Such is the profile (4) of the internal bands of the south t transept of the cathedral of Soissons, of the choir of S. Remy of Rheims (end of 12 th century). On the exterior it had also been recognized, that projecting bands with upper beds left horizontal had the inconvenience of not promptly discharging rainwater. External belts cut according to profile A (5) retained snow, caused drops of rain coming in the direction C D to be reflected to E, thus easily deteriorating and being one cause of the ruin of the base of the surfaces F G above their projection because of this reflection. Until the beginning of the 13 th century, extesnal belts,like those of interiors, were voluntarily decorated by sculptured ornaments, particularly in the provinces of Normandy, Poitou, Saintonge, L Languedoc and the East; men wished these sculptures to be seen, and at the same time preserved from the injuries caused by r rainwater. These ornaments were cut on the beveled surface, a very flat ogee or reverse ogee, and protected by the horizontal upper bed; the most common ornaments were sawteeth, billets, chessboard. (Arts. Dent de Scie, Billette, Damier). But when in the 12 th century, especially in the northern provinces, all the architectural members were subjected to the general system of construction, tendency to never present horizontal surfaces to rain, the belts themselves were p protected by a wash in the stone and a drip. Thus are arranged the belts of tower S. Romain (6) of the cathedral of Rouen. (12 th century). At the same epoch in the southern provinces, men contented themselves with giving a slight projection to external belts, but did not cover them by a very pronounced wash, as done in Ile-de-France, Picardy and Normandy, and t their ornaments were not sheltered by a projection forming a drip. Among other examples, we give here (7) one of the external bands of the north side aisle of church S. Euthrope of S Saintes, that does not present to rain roughnesses easily destroyed, but one however not proctecte by a course or a profile

easily contain two men, always have benches placed along both sides of the recess perpendicular to the front wall. This arrangement of permanent benches in the recesses of windows is retained until the 16 th century. (Arts. Fenetre, Meurtriere).

BANDEAU. Band. Belt.

This is a projecting course of stone decorated by mouldings or ornaments carved or painted, and separating horizontally the stories of a monument. The belt indicates a floor or pavement; it cannot be placed indifferently on a facade or in an interior; it is a rest for the eye, the leveling course for a superposed structure. In churches of the Romanesque epoch, an internal belt nearly always indicates the floor of the triforium and is interrupted by the vertical lines of the engaged columns, or passes before them. In domestic architecture the level of the floor is frequently marked on the exterior by a stone belt. On facades belts separate the superposed architectural arrangements. They have the advantage of protecting the external surfaces, their projection preventing the rain from running down the walls; thus they are generally made of harder stone that that used for the construction of the surfaces, a and especially from the 13 th century their mouldings were p profiled so as to form a drip. The influence of antique Roman profiles is felt in belts as in all other members of Romanesque architecture. Formed in one quite low course, belts until the 12 th century assume very simple forms on the exterior or interior, and they are usually composed of a bevel A, a slightly concave cavetto B, or of an ogee C below a horizontal p plane. (1). These belts are frequently decorated by sculpture, especially from the end of the 11 th century, and they pass a around the vertical projections of the architecture, piers, buttresses, etc. Such are the internal bands of the nave of t the abbey church of Vezelay set horizontally above the arches of the side aisles.(2; beginning of the 12 th century). The u upper bed of this band still forms a horizontal projection. It was soon noticed, that these projections in the interiors of edifices concealed by their projection a part of the surfaces over them. Let A be the profile of an internal band (3), the line most distant from the point of sight being D C, the entire height B C will be lost to the eye, the proportion of

internal plinth of the openings of the cloister of Fontfroide near Narbonne (beginning of the 13 th century) These benches are skilfully combined with the construction of the principal piers of the cloister, as seen in the Figure. The low wall of the cloister serves as a back. Benches with a step before them are still seen in chapter halls, in the warmed rooms of monasteries, and in the parlors.

The great halls of royal palaces, castles, halls of synods, were always furnished with benches around them, as well as the guard halls and vestibules of princely habitations. (Art. Salle). Also permanent benches of stone were placed along the ja jambs of fireplaces, particularly in country residences, in peasants' and farm houses, where the single fireplace served for cooking anf for warming the occupants.

At both sides of the doorways of houses it was likewise usual to place stone benches on the public street, either cut from a single stone, or composed of a slab and supports with or without arms. We have seen these very simple kinds of stone benches along some old houses in the South of France (3), at Cordes, S. Antonin near Alby; there rested travelers on foot and the poor; in the evening after labor men sat there to chat with their neighbors. If the facades of the houses w were strengthened by strongly projecting buttresses supporting galleries and the carpentry of the roof, benches were then placed beside these buttresses perpendicular to the front wall. (Art. Maison). When the walls of the houses or castles presented sufficient thickness, stone benches were reserved between the jambs inside the windows. Here (4) is one of these benches at the window of the second story of a house built during the 13 th century in the city of Flavigny. (Burgundy). It is placed in the recess for the opening; the mullion A separates t this bench into two seats and ends it with an arm; persons s seated turn their backs to the light. But ordinarily when the walls are very thick, like those of fortified castles, benches are placed perpendicular to the opening and along the jambs if the window is wide (5), or at one side if it be narrow(6).

The last example of a bench is common in watch-towers, where sentinels are placed to observe through narrow windows what passes outside. The slots pierced at the base of the curtains under great arches forming little chambers large enough to ea-

railings with the height of a window sill, earlier than the 1 16 th century, are very simple; they are almost always little baloonies fixed to two rails at top and bottom as shown by Fig. 29, copied from a balustrade of the 15 th century, now placed along the triferium of the parish church of Flavigny. In the 16 th century the form of turned balusters was perfectly suited for balustrades of wood; it was proper to use them, and architects did not fail to do so. (Art. Menuiserie).

BANC. Bench. Seat.

Before the end of the 16 th century it was not customary to place in churches chairs or benches of woodwork for believers. Rich women attending the church were followed by servants carrying folding chairs and cushions for their sitting and kneeling. Men and common persons stood or knelt on the pavement. At Rome, in nearly all Italy and a part of Catholic Germany, even today no seats are seen in the church. But when in the 16 th century preaching was introduced throughout France, reformers placed in their temples benches separated by partitions to t the height of a railing and intended for believers. The Catholic clergy doubtless feared that the rigidity of the old tradition would also contribute to divert the people from the ch- urches, and imitated the reformers and introduced benches and chairs. The internal effect of the sacred edifices lost much of its grandeur by this innovation, and when one has seen the crowd kneeling on the pavement of S. Peter of Rome or of S. J John Lateran, that mass of chairs or hollow benches in our Fr French churches completely destroys the religious appearance of assemblies of the believers. There were formerly in our ch churches benches only along the walls of the side aisles or the chapels; these benches formed a kind of continuous plinth between the engaged piers under the arcades decorating the w window sills of these side aisles or chapels. (Art. Arcature). Sometimes these fixed benches of stone even rose above a step, as may be seen in the cathedral of Poitiers,(end of the 12 th century; 1), and along the walls of the nave of the cathedral of Rheims. They were also nearly always placed under the porches of churches, in the splays of portals, in the galleries of cloisters, either along the openings or beside the walls. Here (2) is the arrangement of the benches forming the inter-

shape of a bottle with its neck, and whose combination between the pilasters and heavy rails very disagreeably since the 17 th century crowns most of our edifices. It must be believed that these pieces of dressed stone appeared to be the last expression of taste, for once being adopted, architects no longer troubled the imagination to compose balustrades in harmony with their architecture; whether this were simple or rich, flat or with strong projections, low or high, religious or s secular, the balustrade was always the same or nearly so, although the architects of the 17 th century pretended to divide it into Tuscan, Ionic, Corinthian, etc. They did not content themselves with placing it where need required a barrier at the height of the window sill, but employed it as a motive in decoration. But nothing in antique Roman architecture, that men desired to imitate, authorized such abuse of the balustrade, either in use or in form. It must even be stated, that the projecting cornice of the Roman entablature badly supports t these rows of turned pieces of stone, and that by recession do not indicate the presence of the gutter. The balustrade of mediaeval architecture, set on the top edge of the slope of the corona bearing the gutter, is not only a railing for those passing in the gutter, but it stops falling tiles or slates, and is a safeguard for roofers obliged to place ladders on t the slope of the roof when necessary to repair it; it forms a part of the cornice for the slope of the corona requires a c crowning; while the modern balustrade set on the Roman cornice in the plane of the frieze is great nonsense, since according to the form of the entablature, the gutter finds itself outside and not inside the balustrade. Thus the Roman architects, who possessed the precious quality named common sense, never had the eccentric idea of placing balustrades on the u upper cornices of their edifices, made to support the first tiles of the roofs.

Note 1. p. 98. See Église de S. Eustoche a Paris, by Victor Calliat. Paris. 1850.

We should not omit to speak of the wooden balustrades frequently employed during the 15 th and 16 th centuries. As for the balustrades of metal, they are mentioned in Art. Grille. In the interiors of edifices or under cover were placed balustrades of wood. The few examples remaining to us of these ra-

balustrades. (27).[1]

Note 1. p. 93. See the house of Jacques Coeur at Bourges, where on the balustrades have been carved hearts and shells, and this motto:-- "To the valiant nothing is impossible."

Note 1. p. 9-. This balustrade is cut in thin slabs of granite; it is crowned by alternating crowns and leaves.

In secular architecture of the end of the 15 th and beginning of the 16 th centuries were frequently made blind balustrades, which were under the window sills and were merely wide bands forming a rich decoration. Such were the balustrades connecting the sills of the windows of the second story of mansion de Tremoille at Paris (28), balustrades all varied in design and division; for it is not rare to find great variety in the composition of the same balustrade of the end of the 15 th and beginning of the 16 th centuries.

When taste for antique Roman architecture had effaced at about the middle of the 16 th century the last vestiges of the forms adopted by the middle ages in the details of architecture, men loved to make balustrades composed of reduced orders. There exists a balustrade of this kind at the base of the gable of the little church of Belloy near Beaumont; there is a row of little Doric columns crowned by a dentil cornice with soffit carved between the capitals. At S. Eustache of Paris are seen balustrades formed of little Doric or Composite pilasters, separated by arches borne on piers with their imposts.[1] But this succession of vertical lines of the columns or pilasters assume too great importance in the entire decoration, a and has the inconvenience of recalling at small scale the great divisions and decorations of the architecture then in fashion; that was a major defect, which did not strike the Renaissance architects; they desired to give balustrades their scale, and so that the little columns forming the chief part of their decoration might not seem a diminutive of the architectural orders, they were given a particular swelled form, that made them resemble a little wooden post turned in a lathe. The profiles of these supports are divided in astragals, scotias, s swells, etc. Sometimes even the swelled parts of these columns were decorated by sculptures; they then took the name of balusters, which they have retained. Gradually these balusters b became heavier and attained that odd form, which recalls the

member. But especially at the beginning of the 16 th century paneled balustrades separated by vertical mullions at the joints were odopted without exception. The perforated compartments composing them no longer permitted any other jointing, from their complex form.

During the 15 th century paneled balustrades are frequently found, but are not the only ones. These are then lozenges, t the right angled triangles dominating in the composition of balustrades. It is necessary to state that these forms lend themselves better to a series of perforations in stone, being more stable than curved forms, and in the 15 th century the architect was primarily a stone-jointer.

A part of a balustrade cut as in Fig. 24 possesses much strength and is easily joined at its ends A B. The rail is frequently a different piece, covers and connects these openings. When during the 15 th century the balustrades were composed of panels, the vertical mullions sometimes projected in the form of little buttresses, as indicated in Figs. 25, 26.

It was also in the 15 th century that the idea occurred to carve in the openings of balustrades the principal parts of shields of arms. [1] We give (25) panels from the balustrade croyning the nave of the cathedral of Troyes, and in which t the stonecutters in the 15 th century have alternately represented the keys of S. Peter and fleurs-de-lis. The balustrade restored in the 15 th century at the base of the gable of the S. Chapelle of the palace at Paris likewise presents in each panel a large and beautiful fleur-de-lis inscribed in a circle. (26). A great crowned K held by two angels is detached at the middle of that balustrade, it is the cipher or initial of the name of Charles VII (Karolus), which was there restored. (Art. Cniffre). The balustrade of the oratory built by Louis XI at the south side of the same edifice likewise bears a great crowned L. This custom of placing ciphers or letters in balustrades was quite generally adopted at the end of the 15 th century and the beginning of the 16 th; the chateau of Blois bears on the facade erected by Francis I balustrades in which are seen crowned F s and salamanders. Men went so far as to carve great perforated inscriptions, as on the choir of the church of Ferte-Bernard near Mans, and as at the castle of Josselyn in Brittany may be read the device A PLUS on the

shadow and more vividly outline the planes. But then they made these perforated slabs so lean, that they no longer presented stability, to remedy that inconvenience, they gave them greater thickness, and balustrades that in the 13 th centwry averaged scarcely 5 ins. thick in their open parts, became even 8 ins. thick.

By the effect of perspective, these balustrades seen from below upwards or from the side, present such wide surfaces, that they scarcely allow the openings to be seen. It was necessary to conceal that defect, and so the balustrades were moulded inside same as outside. It was first desired to take out of the light the inclined surfaces of the thickness to obtain accented shadows, by the last means was taken from view a part of their surfaces. (23).

We may be pardoned the length of a theory, that seems to us necessary to make understood the motives of the different transformations made to balustrades up to the 15 th century. We have already stated and we repeat, that this accessory of the architecture of the middle ages is of great importance; it o occupied our old architects and with reason.

A crowning balustrade completes happily or spoils an edifice, according as it is well or badly composed, or whether in its entirety and its details, it is or is not at the scale of the various architectural members of that edifice, whether it aids or opposes its general system of decoration. A balustrade well connected to the cornice serving as its base, in respect to proportions to the monument crowned, that recalls its forms of details without reproducing them at a smaller scale, whose divisions accent the dimensions of the monument, is a work so rare, that it is allowed to believe it one of the dangers in the architecture of the middle ages, and why it is necessary to study with great care such fine examples as remain to us.

The adoption of the system of panels divided at each joint by vertical mullions in the jointing of balustrades sometimes causes the addition of terminations in form of leaves or of points above these mullions, for the architects of the 13 th century,and for greater reason those of the 14 th century, d did not allow in architectural forms a vertical mullion of a certain width without crowning it by something. For them the pilaster losing itself in a horizontal moulding was a truncated

curvilinear equilateral triangles.

Note 1. p. 90. Always that we have to speak of the edifices of the 14 th century, one must not be surprised if we place in the first line the cathedral of Carcassonne, which is the masterpiece of that epoch, and which in style belongs to the architecture of the North.

If we examines section A B of this balustrade, we see the b bevel C is divided by a break caused by a small right angled cut D. This cut produces a fillet parallel to the face of the balustrade. This fillet forms the cusps E, and the second bevel models them. But the solid parts of the architecture, the supports, the little columns, are lost more and more under the subdivisions of the mouldings, the mullions of windows become more slender daily in the hands of the constructors; the balustrades with thes double bevel cut at 45 degrees, and the f fillet of the second plane receive too much light; they appear heavy in comparison with the other architectural members, whose recessed planes are outlined only by some fine lines of light on broad shadows. Therefore bevels cut at 45 degrees in the section of the balustrade were rejected, and planes more vividly accented were desired. Take (21) Fig. 7; if the light ray B C falls on the bevel E F parallel to it, it grazes it and only produces a half tint. But if in Fig. D the bevel has an angle less than 45 degrees, the same light ray B C will l leave the entire part E F in dark shadow. The balustrades being nearly always composed of small curves, the light falls on a great part of the beveled surfaces; to obtain broad shadows it was then necessary to bring as nearly as possible to the horizontal line the sections of these inclined surfaces, so a as to deprive them of light, and as one gives delicacy to lighted parts only by the contrast of broad shadows, so that in architectural forms the lighted parts alone count, and that according to the width or narrowness of their surfaces, they produce heaviness or delicacy, architects desiring to obtain the greatest refinement possible in the sections of balustrades, came to divert more and more the inclined surfaces from the light rays. Already at the end of the 14 th century, they had entirely renounced bevels, that at certain places by the slipping over of the light always give half tints, and replaced them by slightly concave sections (22), that give more

during the 15 th and 16 th centuries.(Fig. 27). What characterizes the balustrades executed in the 14 th century is the a adoption of the system of stone panels, each perforated, separated by a vertical at the joint, and covered by a railing holding them together. If the jointing gains thereby, the succession of vertical divisions separating the adjacent panels takes from the balustrades the appearance they had in the 13 th century, of a continuous crowning member, of a sort of open frieze, leaving to the horizontal lines their quiet simplicity; necessary in monuments of this extent to rest the eyes, that the regular vertical divisions soon fatigue.

Architects were led to sacrifice art to reason; they lost that liberty which had allowed their predecessors to combine inspirations of taste with necessities of construction or of stonecutting. The exercise of that freedom in the arts only belongs to genius, and genius gave place to calculation and methods after the beginning of the 14 th century in all relating to architecture. We give here an example of a balustrade executed in panels of stone, taken from the south transept of the old cathedral of the city of C.rcassonne. The construction of this balustrade dates from about 1325. But it must be said, that the forms of balustrades adopted by the architects of t the 13 th century were long employed' they were made leaner as we have seen in the example presented in Fig. 15, they were covered by mouldings and with perforated cusps; but the principle was frequently retained; yet were preferred angular forms to those produced by combinations of semicircles; pointed curves were esteemed; from vaults and windows they entered i into the most minute details of the architecture. The simple bevels, that in the 13 th century were alone destined to produce the play of light and shade in balustrades, seemed too simple, when all architectural members were infinitely subdivided; it was doubled by a break, and balustrades had mouldings in two planes, one giving the general form or theme, the other being destined to form the cusps or ornamentation. An example is necessary to make understood the use of this new method.

Here (20) is the crowning balustrade of the cornice of the choir of the church just cited, the cathedral of Carcassonne.[1] The generating form or theme of this balustrade, to employ a word perfectly expressing our thought, is a series of curvil-

Note 1. p. 84. There exist but two fragments of this charming balustrade on the two buttresses of the portal, but these fragments clearly indicate the arrangement of the whole. The richness of that balustrade is produced by the extreme delicacy of the architectural members, that accompany and crown it.

Note 1. p. 85. The choir of the cathedral of Troyes was built in 1240-1250, but all the external crowning members were renewed in the 14 th century.

It is not rare to find in the edifices of the beginning of the 14 th century solid balustrades decorated by the imitation of an opening. This is particularly in the country where the stone is too tough or coarse, and does not lend itself to delicate cusps or retain its edges, that this sort of balustrade has been adopted. For example in upper Burgundy where limestone is of a hard nature and difficult to perforate, open balustrades were only made very late, and when the architectural style adopted in France invaded the adjoining provinces, i.e., about the beginning of the 14 th century; and only then when the stonecutters frequently content themselves with solid balustrades, slabs set on edge and decorated by compartments raised from a ground. Thus is cut the balustrade crowning the two chapels of the transept of the church S. Benigne of Dijon. (18 bis). The cloister of the cathedral church of Beziers, w whose erection dates from the first years of the 14 th century, is crowned in the same manner for compartments and jointing, which is caused by the coarse nature of the stone of the country, that is a porous alpine limestone, holding edges badly. Only here (18 ter) the rail forms a covering and is supported on the body of the balustrade. The railing course is cut in a stone of closer grain and protects the slabs of the body, and (a fact to be noted) this railing bears a cresting, a sort of leafy terminals crowning the balustrade. This being solid forms a heavy termination of the arcades of the cloister; its horizontal line detaching itself against the sky (for the cloister is covered by a terrace), and badly connects the pinnacles, that terminate the buttresses: it is evidently to break the dryness of this horizontal line, to which the solid balustrade brings no relief, were arranged these upper finials. S Several examples of these balustrades with leaves are found, even when opened, in some churches of Brittany, especially d

Chelles, author of that portal, comprehended that the excess of riches lavished on a small space could destroy the unity of his composition, for he took care to connect that balustrade with the general divisions of the architecture by little engaged columns, that intersect it aud compel it, so to speak, to take part in the entirety of the decoration. [1] As refined but less skilful, the architects of the 14 th century quickly reached meagerness or heaviness (for these defects are often together in art compositions), by overloading the balustrades with mouldings and combinations more surprising than beautiful. They frequently sought novel arrangements, and did not always content themselves with the openings pierced in a slab as a ground, covered by a horizontal railing. Among these new forms, we shall cite the battlements. The battlements with their verticals showed strongly at the tops of edifices, and already gave a decoration by their simple outline. During the 14 th century, men frequently employed this simple form to apply it to balustrades. Thus was crowned the upper cornice of the choir of the cathedral of Troyes. [1] This example of the balustrade with battlements does not lack originality, but has the defect of not beaing at all in harmony with the edifice; besides we give it only as an exception. (18). The verticals of this balustrade are alternately solid and open; below the spaces are always openings. Behind each solid vertical is a brace A, which gives weight to the entire construction and keeps it upright. One will note that this balustrade is composed of courses of stones of quite small size, and this supports what we said at the beginning of this Article, that the materials and their dimensions exerted an influence on the forms given to the balustrades. Indeed at Troyes were only procured with difficulty thin but long and wide stones, suitable for cutting perforated balustrades set on edge. It was necessary to bring them from Tonnerre; they were very dear, and those repairs m made in the 14 th century to the cathedral of Troyes were executed with extreme parsimony. At church S. Urbain of the same city, nearly contemporaneous with these restorations of the cathedral, but where the question of economy was less imperative, we have seen on the contrary, how the architect profited by the quality and dimensions of the stones from Tonnerre, to make balustrades thin and composed of great pieces.

of the gables, so as to make impossible their overthrow outwards. But to render this perforated balustrade very rigid while delicately opening it, the architect of S. Urbain composed it of a series of connected triangles joined at their sides, and forming as many small inclined ties theoretically abutting against each other so as to avoid possibility of rupture. It must be said, that this is rather a carpentry combenation than a masonry construction; but it is also to be stated, that the stone on which this abnormal function is imposed is that from Tonnerre of extraordinary quality, strength and fineness, that after cutting has the appearance of metal. Certainly that was ingenious and well reasoned for stonecutting; it was impossible to dominate the material in more complete fashion that successfully did the sagacious architect of S. Urbain (Art. construction); but speaking only of the balustrade in question, this series of little triangles similar to the great triangles formed by the gables is bad from the point of view of art. The eye is perplexed by these geometrical figures, similar but unequal; the harmony is destroyed, that should result, not from the similarity of the different parts of an edifice, but from their contrast. Here as in all the ar-architectural forms adopted after this epoch, reasoning and geometrical combination take a too important place; feeling, the enstinct of the artist vanish and are stifled by logic. Love of details and refenements in their use again take from balustrades their severity in form. The architects of the 13 th century were moved by this art feeling, that one finds in the best epochs, and had comprehended that the more the architectural members are of small dimensions, the more their fo forms should be broadly composed, to not destroy the appearance of grandeur that edifices should have; for in multiplying details beyond measure, one belittles instead of aggrandizing the edifice. If sometimes in the 13 th century in some monuments executed with great luxury, one is permitted to make balustades very rich by combination and sculpture; this feeling of grandeur always appears, and the details do not destroy t the masses; for example the balustrade crowning the passage reserved above the south portal of Notre Dame of Paris (17), erected in 1257. It is impossible to group more ornaments and mouldings on a balustrade, and one notes that here Jean de C

of a series of small mullions with arches; there seem preferred then balustrades formed of trefoils, quatrefoils, trinagles or squares set diagonally with cusps, like those crowning the choir and nave of the cathedral of Amiens. We have shown how at the S. Chapelle of Paris were happily broken the inclined lines of the gables crowning the windows, by a balustrade with very numerous supports (Fig. 12), as if the balustrade were made high so as not to be crushed by the height of the pinnacles and gables. That balustrade is independent of these pinnacles and gables, basses between them only resting against them; it leaves them all their value, appearing as it should; i light structure with a separate function, adding nothing to the stability of the masonry, and could be omotted while leaving to the edifice the forms that belong to its architectural composition. Men did not adhere long to such wise rules. From 1290 to 1310 was built at Troyes the church S. Urbain. The u upper windows of the choir of that remarkable edifice are surmounted by opened gables, that do not as at S. Chapelle of P Paris project beyond the crowning cornice and its gutter, but which interrupt it. And such is the labored composition of t this construction, that the two slopes of these gables and t the circles cut in the spandrels support this cornice forming a gutter just as they would ties in carpentry. It is to be feared that these opened gables, that are not connected with the wall, and that cornice gutter resting only on the top of the wall, without being retained in its engaged position by a heavy load on it, might fall outward. The constructor thought to use the balustrade to prevent this overturn (16), and see how he did it. It must first be stated, that in each bay rises a buttress with pinnacle well connected to the mass of the structure; taking this pinnacle as a fixed point (it is such indeed), the architect made his half balustrades - of a single piece for each, and having taken care to set his pinnacles in a plane outside that of the gables, he maintained t the tops of the latter by staying them with the balustrades, as indicated in plan (16 bis). Let B be the pinnacle fixed by its base supporting the gutter and strongly engaged in the c construction, C C being tops of the gables; the half bays of the balustrades B C being each of a single piece, and forming in plan a reentrant angle at C, they stay and abut the tops C

bases by a member, and the trefoil arcade will be cut in the same perforated slab of stone. The supporting slab A will alone be added. Thus at each step we are stopped by a transition, an advance that must be stated, and we must almost always render justice to the sure taste of those practitioners of the 1 13 th century, who knew so well how to modify the dry and cold laws of reason by the instinct of the artist, by an imagination that never failed them.

Note 1. p. 76. This balustrade does not belong to the primary construction of the nave, which dates back to 1210 at latest; it was rebuilt about 1230, when after a fire the upper part of the nave was completely restored and renewed. (Art. Cathedrale).

Balustrades evidently long one of the details of pointed a architecture to which was devoted particular attention; but it is necessary to admit already at the end of the 13 th century, that if they presented inmenious and frequently beautiful combinations, they are not found as intimately connected with the architecture; they are sometimes like a separate work no longer participating in the effect of the whole, and the choice of their designs and compartments does not always seem to have beeu made for the place they occupy. The upper balustrade of the choir of the cathedral of Beauvais is an example (14); the alternation of quatrefoils set square and diagonally is happy; but this balustrade is much too meagre for its place, the openings are too large, aud from a distance it does not lend sufficient strength to the crown. Under this balustrade the cornice, though refined, appears heavy and poor at the s same time. We shall again find this combination of balustrades, still leaner, above the chapels of church S. Ouen of Rouen, (15). The defects are still more shocking there, in spite of the fact that the balustrade in itself and as stonecutting is a masterpiece of perfection; but being placed on the sides of polygons of small extent, it has only four or five panels; t their design is not seen at the first glance, because the eye cannot seize that alternating combination, which would be happy if it were developed in great length. The excessive leanness of that balustrade gives it the appearance of a metal railing and not of being cut out of stone. Further, from the end of the 13 th century are more rarely met balustrades composed

whose details are consequently small, whose bays, instead of being as wide as on the cathedral, are narrow and intersected by solid gables surmounting the arches of the windows. Will the architect make the error of placing on the opper cornice a wide balustrade, that by the great spacing of its supports will reduce to the eye the width of the bays, whose design w will be appreciated with difficulty, visible only between the pinnacles and the gables near together? Not at all; on the c contrary he will seek to narrow the open arcade of his balustrade, to make it thin and strong to support its crowning member; he will obtain delicate and multiplied shades by the combination of his trefoils, by the saml1 openings pierced between them; he will make this balustrade high to connect the g gables to the pinnacles (12), and to prevent the great roof from appearing to crush the slenderness of the masonry, to establish a transition from this roof, its important accessories and the richness of the cornices and windows; but he w will have the care of leaving to this balustrade its appearance of a perforated slab, so that it cannot compete with the strong projections and broad shadows of these gables and pinnacles. In the same edifice, the architect must crown a porch covered by a terrace by a balustrade. Will he take for model the balustrade of the main roof? Not at all; still retaining the memory of those beautiful open works of the beginning of the 13 th century, composed of little columns supporting a strong and simple arcade like those we have given (Fig. 4); understanding that on an edifice covered by a terrace is required a crowning member with solid appearance, that receives value as much by combination of lines and projections as by its richness, and that a flat slab pierced by openings with simple chamfers on the angles cannot satisfy that need of the eye, he erects a balustrade ornamented by capitals supporting an arcade cut in trefoils, with sunken trefoils, whose vivid shadows add to the effect of the cornice by completing it, a and to that of the pinnacles by connecting them (13). But we are now at the middle of the 13 th century, and if the balustrade of the porch of S. Chapelle is a last remembrance of t that primitive openwork constructed by means of detached supports of an arcade, it will remain in construction a balustrade of its epoch, i.e., of little columns connected at their

superposed, that is so true, that men have sought in the openings to avoid a right angle, that might cause ruptures. The feet of the verticals stand on the moulding beneath, not abruptly but are but are connected by a slant formink a base intended to strengthen the foot and facilitate cutting. (11). Visible at A is the junction of the mullion with the moulding forming the lower course; at B is the impost of the trefoils on these mullions. If these forms are clearly accented, if t the curves are frankly separated from the verticals, yet either by instinct or by reason, if has been sought to avoid here every form suggesting the presence of a bed or joint. But we repeat, the artists of that time knew how, without renouncing principles based on reason, to give a large part, to submit to the refined laws of taste. If we believe that we should enlarge thus on a detail of pointed architecture, that seems quite secondary, it is indeed because this detail acquires g great importance in execution as because it crowns. The architecture of the 13 th century desires the balustrade to form a part of the cornice; for most of the time they cannot be s separated; its height, proportions of solids and voids, divisions and ornamentation, must be combined with the width of the bays, the height of courses and the richness or simplicity of the ornaments of the cornice. A balustrade that is suited to a certain church, and that produces a good effect in its p place, would appear ridiculous elsewhere. Then it is not a balustrade that must be seen on a monument, but is the balustrade of that monument, hence we cannot pretend to give an e example of each variety of balustrades executed from 1200 to 1300, still less cause it to be supposed, that a certain balustrade of a certain epoch on a certain church of a province could be employed on all edifices of the same epoch in that province. We see here (Fig. 10) a balustrade executed from 1230 to 1240. This balustrade is set on a cornice of a great edifice, where everything is largely conceived at a great scale. Thus the spacing of its mullions is wide, its trefoils are open with no details; simple bevels and forms emphasized to obtain shadows, vivid and frank lights, to produce a clear effect easy to seize at a great distance. Then see that in t the same epoch and perhaps with a difference of five years, the S. Chapelle of the palace was erected, a small edifice,

effect, when they developed in small bays intersected by pinnacles or vertical supports, then it was necessary to return to frequent divisions in which the vertical line was recalled, especially if the balustrades served as the upper crown of t the architecture. Besides the division of the openings of the balustrades trefoils or quatrefoils were imperative, being i impossible to diminish or increase at pleasure; if one bay f for example allowed the laying off of five quatrefoils, a narrower bay or one wider by a few inches deranged that arrangement, or compelled at the ends of the bay of the balustrade the use of but a part of a trefoil or quatrefoil; this did n not have a happy effect. The divisions of balustrades into vertical arcades on the contrary allowed a number of complete openings, and it was then easy to disguise the differences in widths of bays.

We shall make what we say here easily understood by a figure. Let A B (9) be a bay of a balustrade comprising 3 quatrefoils; if the succeeding bay A C is a little shorter, it is necessary for one of the three openings to be in part engaged. But if the bay (9 bis) is divided in arches, the bay A C could only contain 4, and the eye finding complete forms in both, would not be shocked. The vertical divisions even permit considerable differences in the spacing of the axes, without these differences being appreciable in execution; their design is more easily understood in closer spacing, which does not allow combinations of the circle to develop in sufficient number, for it is with architectural ornamentation as with melodies, that must be repeated to be understood and to produce their entire effect. The upper balustrade of the choir of Notre Dame of P Paris was executed about 1230, and is divided into bays of u unequal width, being designed in conformity to this principle. (10). At certain distances opposite the flying buttresses and the gargoyles, a pier surmounted by a great cross-flower divides these bays, serves at the same time as a reinforcement for the balustrade and prevents overturning, which without this support would not fail to occur in such a great length.[1] But one should indeed note, that if this balustrade has some relation to those constructed in courses a few years earlier, yet one sees that this is evidently a perforation, an opening pierced in a slab and not constructed by pieces of stone sup-

the supports. It was indeed necessary to load these supports heavily to keep them vertical. When balustrades were made of a single slab of stone on the contrary, the size was given to the base of the lower part, and lightness to the upper part, for one did not then fear the displacement caused by the numerous horizontal joints. The balustrades of the great galleries of the facade and of the tops of the two towers of the c cathedral of Paris are cut according to this principle (7); their bases are spread strongly and prolong the slop of the corona of the cornice; a quatrefoil opening produces a continuous decoration, that no longer indicates the separate points of support, but properly allow it to be seen, that this decoration is cut in a single slab of stone; a projecting rail is cut in the thickness of the slab, serves as a moulding and pr protects the openings. At the angles, the balustrade of the great gallery is strengthened by solid parts ornamented by g great projecting crockets and figures of animals, that break the monotony of the horizontal line of the railing. (Art. Animaux). The external palustrade of the triforium of the same church, lighter because it crowns a work of less importance, still has the spread at the bottom necessary for stability. To prevent displacement this foot is set in a groove in the corona. (8). It is however unnecessarw to regard the principles here stated as being absolute; if the architects of the 13 th century were subject to the rules of logic, they were not what we call today rationalists. the feeling for form and suitability had a great hold on their minds, and at need they knew how to bend a principle to these laws of taste, that cannot be formulated, but are the more imperious because addressed to instruct and not to reason. Particularly in the accessories of the architecture required by a need and at the same time necessary for the decoration, that taste should intervene, and that it does participate then. Thus in seeking to give to their balustrades cut from perforated slabs the appearance of an object cut in one piece, it was necessary, that these important parts of the decoration should not by their form c contradict the principal lines of the architecture. If the o openings obtained by trefoils or quatrefoils adjacent were suited for continuous balustrades not interrupted by vertical divisions near each other, these openings produced a bad eff-

know is that crowning the gallery of the kings on the western facade of the cathedral of Paris; it belongs to the first years of the 13 th century (1215-1225) like all the lower part of the facade.(4). Before the restoration of the portal, this balustrade only existed beside the two side buttresses, as can be assured; [1] it is constructed of several pieces, at least the arched portion, and consists of a caurse supporting the bases, the little columns set edgewise the grain with piers behind them, and a crowning course cut in arches, decorated by dogtooth ornaments. There exists still on the intermediate t galleries of the towers of the portal of the Calende at the cathedral of Rouen a balustrade from the beginning of the 13 th century, likewise constructed of superposed blocks.(5). Here the little columns rest directly on the corona of the cornice forming a passage, allowing the water to run off between them without a gutter. It was only towards 1230 that were established gutters leading the water to the gargoyles; until then the water ran over the corona of the cornice, as at the cathedral of Chartres at the edges of the great roofs; but t these balustrades, composed of little piers or columns isolated and fixed on the cornice, retained their vertical position with difficulty. Constructors had sometimes attempted to connect their bases by means of a continuous course hollowed out underneath for discharge of the water, as we can see at the eaves of the high north choir of the cathedral of Chartres; (6); but this means only made the danger greater by multiplying the bed joints, and did not give these railings the rigidity necessary to prevent bending; men must soon reject little columns or piers, isolated and only connected by the upper c continuous course, and they decided to make the balustrades of a single block of stone; then the little columns with capitals had no reason for existence, for instead of a constructed arcade, it was simply necessary to cut slabs pierced by openings,and taking forms unsuited for superposed courses. Thus good sense, the logical mind directing the architects of those epochs, caused them to change the forms of details, like their entire architecture, as they modified the means of construction. In the constructed balustrades, i.e., composed of isolated supports and a crowning course, it was noticed that the upper part of the balustrade is very large in comparison to t

that period presen an extreme variety in form and construction. The nature of the stone has much influence on their composition. Where the materials are hard anf resistant, but of fine grain and easily cut, the balustrades are light and very open; on the contrary where the stone is soft, the openings are smaller, the solid parts are thicker. Their dimensions a are also subject to the dimensions of the materials, for they soon rejected balustrades composed of several pieces of stone set on each other, as not offering a sufficient bed, and they were cut from a slab set on edge. In Normandy and Champagne, where the stone is generally quarried only in blocks of small dimensions, balustrades are low and do not reach the height of a window sill. (At least 3.3 ft.). In parts of Burgundy w where the stone is very hard, difficult to cut, and is not q quarried readily in thin beds, balustrades are rare and only appear very late, when the architecture imposed forms adopted in the royal domain, on all the adjoining provinces, i.e., a about the end of the 13 th century. The basins of the Seine and Oise offered builders materials with qualities very suitable for making balustrades, thus in these countries are found varied examples of this important part of the decoration of edifices. As the custom of sawing blocks into thin slabs was not practised in the 13 th century, it was necessary to find in the quarries naturally thin beds permitting the construction of light open balustrades. The "cliquart" of Paris, the lias of the Oise, certain stones of Tonnerre and of Vernon, that could be quarried in layers 6 to 8 ins. thick, were marvelously suited for the construction of balustrades of large pieces of stone set on edge and perforated. The architects further were ingenious everywhere in inventing a jointing so as to obviate the insufficiency of the materials they possessed, and this jointing, as one must suppose, had a great influence on the forms adopted. It is with balustrades as with the tracery of windows, like all delicate parts of pointed a architecture of the 13 th and 14 th centuries; the nature of the stone determines the form up to a certain point, or at least modifies it. Only with care should one study these variations, that cannot be indifferently applied to the various provinces in which pointed architecture has developed.

In Ile-de-France, one of the earliest balustrades that we

exteriors of great edifices an easy circulation at all the s stories by means of gutters or galleries, and that men felt the resulting need of protection from the danger of these narrow passages by furnishing them with balustrades; but before that epoch, in the interiors of churches or of great halls w were established galleries and tribunes with access for the public, and that it was consequently necessary to equip with railings. It is certain that these railings were frequently made of wood during the Romanesque epoch; when they were of stone, they were rather low walls than balustrades. The gallery of the porch of the abbey church of Vezelay (a porch whose construction can be comprised between 1150 and 1160), is furnished with a low wall, that cam be rigorously classed with balustrades, this wall beind decorated by great chevrons, that give it the appearance of a crown much lighter than the rest of the structure. (1). The internal galleries of the two gables of the transepts of the same church, constructed during the last years of the 12 th or in the beginning of the 13 th centuries, posses beautiful solid balustrades or walls ornamented by arches, on which are set the little columns of the triforium. We give here (2) the balustrade of the south gallery, whose design produces a great effect.

But men did not hesitate, when the architecture assumed lighter forms, to open the balustrades; a remnant of Roman tradition caused them to retain for a certain time the little columns wit capitals in their composition. The balustrades were only open arcades, constructed by means of little columns or spaced piers, on which was placed a course opened by pointed arches. The remains of the primitive triforium of the nave o of the cathedral of Rouen (1220-1230) present in the inteeior a balustrade so composed, connected to the columns supporting the great arcade forming the gallery, so as to offer greater resistance.(3). One will easily conceive indeed, that an opening rested on such slender supports, unable to maintain themselves for a great length without some projections to give t them rigidity. But especially on the exteriors of monuments balustrades play an important part from the 13 th century, f for as we have already stated, there dates from the beginning of tha century the establishment of gutters and galleries f for circulation on each story. The balustrades erected durius

the void through a thin slit, when the drying occurs this mortar lessens in volume, and the stones rest only on the slips. fortunately for our modern edifices, one has the care of setting a block of stone three or four times as large as necessary, and that due to the excess of strength, each stone is o only subject to a small pressure; but when men built in the middle ages, the architects were led to set a block of stone rather too small than too large, it then became necessary to set these stones on the entire surface of their beds, so as to profit by their entirel force of resistance. Then stones were set on a bed of mortar, i.e., only after having spread over the upper bed of a cirst course of stone a thick layer of mortar little thinned; a second course was set on that layer, taking care to support it by means of pieces of wood until refusal, which in masons' terms means that the mortar having spread under blows of the sledge, refuses to be compressed further. Thus are obtained structures resisting considerable pressure without fearing to see the stones spalled, and avoiding settlements, that in very high edifices on slender supports, would have disastrous consequences. (Art.Construction).

BALCON. See Breteche.

BALUSTRADE. Balustrade. Barapet.

The name of balustrade is alone employed today to designate the railing at the height of a window sill, most frequently perforated, that crowns the gutters at the eaves of roofs, t that are placed along galleries or elevated terraces, to prevent one from falling. External balustrades above the cornices of edifices are not found before the pointed period, for the reason that until that time the roofs did not send their water into gutters, but allowed it to fall directly on the ground. Without affirming that there had been no balustrades on Romanesque monuments, knowing no example to cite, we refrain. But it is proper to divide balustrades into internal balustrades, that are destined for the fronts of galleries a and tribunes, and into external balustrades, placed on the gutters of roofs or at the edges of the paved terraces of edifices.

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are thus supported by walls 4.1 ft. high, that we give here. (1). These walls are decorated by a course of dentils below the plates and are further prieced by openings to light and ventilate the carpentry of the roof. (Bad 1). later about the middle of the 13 th century these walls were provided with a top course forming a drip to prevent the water falling from the roof from injuring the surface of the stone, and to cause it to fall directly into the gutter. (2). There are found at Amiens, Beauvais, at the S. Chapelle of Paris, eave walls so crowned. This projecting moulding also permitted the placing of blocks A, and of leaving a free circulation of air between the feet of the rafters, plates and covering, and it protected these timbers from dry rot. The eave walls of great roofs rarely have more than 1.3 or 2.0 ft. in thickness, and rest on the side arches of the upper vaults (Arts. Construction, Charpente), leaving the greatest possible width to the top of the walls for establishing the gutters. Sometimes even the eave walls of roofs are placed on discharging arches transferring the weight of the carpentry to the imposts of the i internal vaults; then the entire thickness of the walls is re reserved for placing the gutters. The columns of internal galleries, during the Romanesque epoch and the beginning of the pointed period, are often set on little supporting walls, that are actual eave walls. The little columns of the triforium of the porch of the church of Vezelay are so arranged. Even in the nave and choir of the cathedral of Amiens again on an eave wall are set the columns of the triforium.(Art. Triforium).

BAINS. See Etuve. Baths.

BAIN DE MORTIER. Bed of mortar.

In masonry works, thus is designated the bed of mortar on which is set a cut stone or rubble. At Paris since the beginning of the 17 th century, cut stones are set on slips of wood and are pointed with mortar, i.e., the open joint between the stones by removal of the slips is filled with mortar by means of thin blades cut in saw-teeth. This procedure has the inconvenience of never filling the joints with a mortar sufficiently dense to resist pressure. The pointers being compelled to thin the mortar much, to introduce it between the stones, into

are thus supported by walls 4.1 ft. high, that we give here. (1). These walls are decorated by a course of dentils below the plates and are further prieced by openings to light and ventilate the carpentry of the roof. (Bad !). later about the middle of the 13 th century these walls were provided with a top course forming a drip to prevent the water falling from the roof from injuring the surface of the stone, and to cause it to fall directly into the gutter. (2). There are found at Amiens, Beauvais, at the S. Chapelle of Paris, eave walls so crowned. This projecting moulding also permitted the placing of blocks A,and of leaving a free circulation of air between the feet of the rafters, plates and covering, and it protected these timbers from dry rot. The eave walls of great roofs rarely have more than 1.3 or 2.0 ft. in thickness, and rest on the side arches of the upper vaults (Arts. Construction, Charpente), leaving the greatest possible width to the top of the walls for establishing the gutters. Sometimes even the eave walls of roofs are placed on discharging arches transferring the weight of the carpentry to the imposts of the i internal vaults; then the entire thickness of the walls is re reserved for placing the gutters. The columns of internal galleries, during the Romanesque epoch and the beginning of the pointed period, are often set on little supporting walls, that are actual eave walls. The little columns of the triforium of the porch of the church of Vezelay are so arranged. Even in the nave and choir of the cathedral of Amiens again on an eave wall are set the columns of the triforium.(Art. Triforium).

BAINS. See Etuve. Baths.

BAIN DE MORTIER. Bed of mortar.

In masonry works, thus is designated the bed of mortar on which is set a cut stone or rubble. At Paris since the beginning of the 17 th century, cut stones are set on slips of wood and are pointed with mortar, i.e., the open joint between the stones by removal of the slips is filled with mortar by means of thin blades cut in saw-teeth. This procedure has the inconvenience of never filling the joints with a mortar sufficiently dense to resist pressure. The pointers being compelled to thin the mortar much, to introduce it between the stones, into

decorated or plain, that surrounds the base of the cross-flower of pinnacles or gables, etc. (Art. Fleuron).

BAGUETTE. Astragal. Half Round.

A member or cylindrical moulding of small diameter, forming a part of cornices, bands, archivolts and ribs. The astragal only has a diameter of 0.4 to 2.0 ins.; Over that size it takes the name of round. (Art. Boudin). But what particularly distinguishes the astragal from the round is its secondary function. Thus in the sections here given the diagonal arches of the 13 th century (1), A is an astragal and B is a round. In the Romanesque architecture of Poitou and of Normandy, the astragal is sometimes beaded (2); its section C in that case is often flat, so that the light clearly cuts out each of the beads or little disks. In the architecture of the 12 th, 13 th and 14 th centuries, architects employed the astragal with the cluster of columns to emphasize their diameter by contrast, and to give them more strength to the eye (3). One frequently finds in the edifices of the 13 th and 14 th centuries rounds cut in the angles of square piers, and especially in the jambs of doorways to avoid the sharp corners, that are easily worn off or can hurt a person. (4). The round does not then extend to the ground, but stops at the sharp angle reserved at the lower part, either on an oblique plane D, stopping square at E, or concealed by an ornament F, which is very frequently fo found in edifices in Burgundy dating from the end of the 12 th or beginning of the 13 th centuries. (Art. Conge). In joinery the astragal is one of the members of mouldings most frequently employed.

BAHUT. Eave or Coping Wall.

This name is given to a low wall intended to support a roof above a gutter, the open arcade of a cloister, a grille or b barrier. When in the 13 th century there were established without exception on all edifices of some importance, stone gutters decorated by balustrades at the eaves of the roofs, these were erected on low walls protecting their base (to avoid injuries to the coverings by passing along the gutters), and preventing the leaks produced by a mass of snow or heavy rains. The great roofs of the choir and nave of the cathedral of Paris

ornamented by leaves holding the little columns of the side aisle around the choir of the cathedral of Langres (2; middle of 12 th century); 2, of a ring of the little shafts of the side aisles of the nave of the cathedral of Sens (3; end of 12 th century), presenting a wide moulding with recesses. At the beginning of the 13 th century rings were only composed of their mouldings without ornaments, as one may observe in the side aisles of the south transept of the cathedral of Soissons, in the nave of the cathedral of Laon, in the choir of the church of Vezelay (4), and in a great number of edifices in the north and east of France. Sometimes also on detached columns and then are merely an ornament, a means of ornamenting the junction of two drums of the shaft. One of the most beautiful examples of this kind of rings is found in the refectory of the priory of S. Martin-des-Champs at Paris. (5). The columns supporting the vaults divide the hall in two aisles. These c columns are very high, and consist of two pieces of stone connected by a ring; the ring is the more necessary here because the lower piece has a greater diameter than the upper shalf. (Art. Colonne). Here again is an example of a ring or moulded drum dividing a column in two portions of the shaft.(5 bis). The ring is here an actual course between two pieces of stone set on edge. This column belongs to one of the houses of the 13 th century in the city of Dol in Brittany. [1] We cannot omit the metal rings that support the little columns of the cathedral of Salisbury, although that edifice does not belong to French architecture; but this example is too precious not to be mentioned. As everyone knows, the cathedral of Salisbury was built with great care; the piers of the nave are built in courses, giving in plan a form composed of four semicircles, and in the curved reentrant angles receive four little columns with shafts in tuo pieces in height. The joints connecting these shafts are placed at the same level for all the piers, and are held by rengs or collars of bronze anchored into the pier by means of a fish-tail anchor (6); A represents one of these rings with its anchor, and B is the section of the bronze ring.

Note 1. p. 63. We owe this curious drawing to M. Ruprich-Robert.

The name of ring is also given to the projecting mouldings,

BAFE. BEE. Clear opening.

An old word still used in construction, which signifies the clear width of a doorway, window, or of any opening pierced in a wall or partition. (Arts. Fenetre, Porte).

BAGUE. Ring. Band.

By this word is meant a moulded member, that horizontally divides the height of columns. When in the 12 th century the great square or cylindrical piers in edifices were replaced by clustered columns of small diameter, these little columns must be cut from stones set on edge, that did not have sufficient length to form a single piece from the base to the capital. Their small diameter in comparison to their length compelled constructors to arrange one or more joints in their h height; these little columns were the more slender, because they were placed against a pier or wall, and their joints became more frequent as they were thinner. The joints were one cause of dislocation; it was then necessary to prevent fractures or displacement at those points. The necessity for guarding against these inconveniences at once became a decorative motive. By inserting between the long pieces of the little columns of stone on edge a thin course of hard stone bonded into the mass of the pier or wall, the architects of the 12 th century made them stable and fixed them to the structure. To make this better understood, we give here a ring arranged as we have just indicated (1); Fig. 7 presents the ring before setting the shafts of the little columns, and Fig. 8 gives t the ring after setting the shafts. Once adopting this principle, men only ceased to apply it when the little shafts formed a part of the courses in construction, when the materials employed were sufficiently large and resistant to allow the omission of joints in their height, or when at the middle of t the 13 th century men systematically avoided crossing the vertical lines of the architecture by horizontal lines. The structural reasons that had caused rings to be adopted (Art. Construction) being well understood, we shall present a series of examples of this architectural member, so frequently employed in the 12 th and beginning of the 13 th centuries.

In the 12 th century the rings were often decorated by leaves, beads, diamond points. Here are examples; 1, of a ring

cross. But no certain evidence supports that conjecture, that further has nothing contrary to the ideas of the middle ages, and which we give here only as an ingenious ekplanation, if not entirely satisfactory.

BADIGEON. Painting. Whitewash.

This is a paint of uniform color passed both over the walls and the architectural members on the exterior or interior of an edifice. It is scarcely more than two centuries, that men have undertaken to coat with size or lime edifices, in order to conceal their age or irregular color of the stone beneath a uniform coat of paint roughly applied. Most of our old churches have thus been coated internally several times, so that the successive layers of paint make a thickness, that obscures all the members of the mouldings and of sculpture. Frequently the coating of paint covers old paintings defaced by time; it is then important to be certain, when one desires to remove the paint, that it does not conceal precious vestiges of old paintings; in that case it should be scraped or washed off o only with the greatest precautions. [1]

Note 1. p. 59. The paint can be removed in several ways, o according to its nature. When it is thick and is composed of several layers, and the stone on which it was laid is not porous, it is easily removed in scales by means of scrapers of hard wood. If it covers old paintings, this process succeeds best, for then it bares and does not remove with it paintings applied directly on the stone. If on the contrary the coat of paint be very thin, the wet method is preferable. In this case there is wetted with warm water by means of sponges or brushes the parts of the paint to be removed, and when the moisture commences to evaporate, they are scraped with a wooden tool. Nearly always the paint falls off like a skin. Washing with much water is the most economical means and often succeeds; it can be employed with success, if the paint be thin, and if it does not cover old paintings. In any case, one must beware of iron scrapers, that in the hands of workman remove with t the paint the surface of the stone, blur and deform the mouldings and change the sculptures, particularly if the stone is soft.

further very simple, composed of brackets fastened to the corbels just mentioned. [1] Many public edifices had their doorways equipped with hoods. The entrances of hospitals, asylums, monasteries, were sheltered by hoods to permit the poor to await under cover the aid they came to ask. Very few of these carpentry constructions are preserved today? their fragility, their objectionable projections into the public street, caused them to be removed. particularly in manuscripts, old engravings, are hoods represented in great numbers before the doorways of public or private edifices. We see one yet over the principal doorway of the hospital of Baune, that dates from the 15 th century; we give it rere.(2). [1] There was one over the portal of the old hospital of Paris, that is seen represented in old engravings of the place before Notre Dame. These hoods were nearly always covered by light materials, such as slates, shingles, or by lead ornamented and gilded. It is to be presumed that those of shops fastened to stone corbels were even frequently composed only of movable cloths, supported by cross and inclined poles, as still practised today before shops to protect goods from the sun.

Note 1. p. 57. See Architecture civile et domestique of Verdier and Cottois. Pub. Victor Didron.

AVANT - BEC. Outwater.

Thus are termed the strengthening projections built on the upstream side of bridge piers, forming an angle in plan more or less acute, in order to divide the current and guard the piers from the effects of ice. (Art. Pont).

AXE. Axis.

Axis is the name given in architecture to the line dividing the edifice in two equal parts. It is also the line passing entirely through the centre of a pier or column, that in elevation divides a bay, or a symmetrical architectural member in two similar portions. In most plans of mediaeval churches of the 11 th to the 14 th centuries, it is observed that the axis of the nave and that of the choir form a broken line at the crossing. It has been desired to see in that inclination of the axis of the choir (usually to the north) an intention to recall the inclination of the head of Christ dying on the

two figures of bishops in relief; but Marseilles did not then form a part of France. One still sees in the church of Avenas an altar, on the face of which are sculptured Christ, the four evangelists and the twelve apostles. That altar is faithfully represented in Architecture du Ve au XVII siecle, by M. Gailhabaud. We do not also pretend to affirm, that there were not in France other altar fronts ornamented by figures of saints or of divine personages, for the examples of ancient altars are too rare for one to affirm anything in that respect.

Note 1. p. 54. The altar here given is copied from a relief on the portal of the gilded Virgin of the cathedral of Amiens. This relief belongs to the second half of the 13 th century.

Note 2. p. 54. An altar of this kind is to be seen in the Museum of the Great Garden at Dresden, this altar belongs to the last years of the 15 th century.

Note 1. p. 56. This sculpture belongs to the second lintel of the portal of S. Anne; it is a late addition in the 13 th century to the lintel, which dates from the 12 th century.

Note 2. p. 56. The altar of the church of Foll-Goet is of black stone of Kersantun; the little niches are filled by figures of angels alternately holding scrolls and shields.

AUVENT. Hood.

This is the name given to a work of carpentry constructed in a permanent or temporary manner over a doorway, before a shop or hall opening on the ground floor, to shelter persons entering or leaving. During the middle ages the name of "ague" was also given to the "auvent"(hood). It is distinguished from the porch in that the latter is supported by pillars more or less numerous, while the hood is fixed on the wall over the doorway or openiug it is designed to shelter. Most houses erected in the 12 th, 13 th and 14 th centuries had their entrances and their shops covered by hoods attached to projecting corbels, still found in great numbers. In this case, the hood had the form of a shed roof, i.e., it was a single slope conducting the rainwater into the middle of the street. The shops of the merchants were generally open, and purchasers remained in the street outside the drip; this compelled to give them shelter as well as the goods, by means of a projecting roof not interfering with passage. (Art. Boutique). These hoods w

of the altar under the table.[1] Admitting that there was no question of propriety, the cloths of ancient altars fell very low (21),[1] so that it was useless to place on the front reliefs, that could not be seen. But during the 15 th and 16 th centuries were frequently carved figures of saints on the fronts of altars, augels and scenes from the Passion; there was even represented beneath the table of the altar Christ in the sepulchre in full relief, with the holy women and the sleeping soldiers.[2] Only in the 16 th century did the altar cease to take the form of a table or a chest to adopt that of a tomb or sarcophagus. Until then the altar was not the tomb of Christ or of a martyr; it covered the tomb, was the table placed over or before the tomb, and even over the crypt containing t the tomb. This idea is dominant, and the examples that we have given, more than abundantly prove it. The fashion in which are arranged the sacred bodies behind the altars of S. Firmiu, of the Virgin and of S. Eustache of the same church, of Valcabrere, even of the cathedral of Amiens, indicate very clearly, that the altar is not a tomb, but a piece of furniture placed before or over the holy relics. A relief of the portal of S. Anne at Notre Dame of Paris gives in a naive manner the actual significance of the altar (22). There is seen a crypt expressed by the arches beneath the steps; three little openings a are in the upper part of this crypt and indicate the location of the shrine of the saint; thus the altar against a wall rises over the crypt and the shrine, and is covered by cloths; the ciborium alone is placed on the table and a lamp is suspended above it. But from the 16 th century the altar itself becomes a representation of the tomb; by preference it takes the form of a sealed sarcophagus. The solid altars preceding the 16 th century, such as those of S. Germer, Paray-le-Monial (23) of the 12 th century, the altar overlaid with glass in S. Denis (Fig. 18), even that of the church of Foll-Goet (Brittany) (24),[2] which dates from the beginning of the 16 th c century, always retain the appearance of a piece of furniture. That traditional form is lost with the last vestiges of the arts of the middle ages.

Note 1. p. 53. We say in the north, because there exists in the cathedral of Marseilles an altar of the 12 th century, w whose front is decorated by a figure of the holy Virgin and

Leclerc. A silver lustre with three branches was suspended b before the altar. Two great chandeliers of copper were further placed in the sanctuary. A canopy in form of an oblong square, covered by a silken fabric spotted with fleurs-de-lis, was suspended from the vault directly over the able of the a altar. At the two rear angles of the altar and at the ends of the reredos were set on the pavement two columns of copper in the form of trees bearing leaves and fruits. The corollas of the flowers bore wax candles, that were lighted on feast days before the shrine of the saints. As for the suspension of the holy sacrement, this had been restored in the 17 th and 18 th centuries. There is no mention in the chapter registers from which these facts are derived, of the enclosure that surrounded the apse behind the altar as in the S. Chapelle of Paris; but there is every reason to believe, that this double enclosure and vaulted formed an elevated gallery, on which was exposed shrines, numerous and of great richness at the cathedral of Amiens. Behind the high altar at the back of the apse was erected the little rear altar; it was decorated by a group of statues representing Christ laid in the tomb, executed in 1481.

Note 1. p. 51. Diss. s. l. princ. out. d. eglises. Chap. 24, p. 209.

Note 1. p. 52. This plan was communicated to us by M. Duthoit of Amiens; it is copied from a drawing made in 1727, and is now deposited in the precious collection of M. Gilbert, t the indefatigable historian of our ancient northern cathedrals.

Note 2. p. 52. M. Goze; to that archaeologist, whose courtesy has never failed us, we owe the following description, taken from the registers now deposited in the communal library of Amiens.

To close properly this choir, tombs of bishops surmounted by open arcades and terminated by gables and turrets were arranged between the piers of the apse. It was only in 1755, that the entire sanctuary of the cathedral was overturned to give place to images of plaster and rays of gilded wood, with great censers, rumpled draperies, and great scared angels also in plaster.

It does not appear that until the 15 th century it was customary in the north of France to place statues of saints, and for a stronger reason Christ or the holy Virgin, on the front

rubbish monuments so valuable and so precious, to put in their places theatrical decorations, in which all the traditions are forgotten; we ask, can one find courage to blame the destroyers of 1793, who in their turn overthrew what they had seen destroyed some years earlier by the chapters and bishops themselves? These losses are unfortunately irreparable, for admitting that today by a return to the past, men attempt to reestablish our old altars, never would be given to them that venerable appearance, that time had impressed on them; one can make imitations, but one cannot restore to us so many art works accumulated by the piety of prelates and believers under the influence of the same thought; for until the reformation, save some slight modifications made by the taste of each century, the arrangement of the altars was very nearly the same. See a proof. The high altar of the cathedral of Amiens was erected in the 15 th century and the beginning of the 16 th, either because the old altar was merely temporary, or because it had been ruined in the disastrous wars of the 14 th and 15 th centuries. This new altar recalled the arrangement of that of the S. Chapelle, which is easy to recognize by examining the plan (20), [1] that we present here. Thanks to the zeal of a n native of Amiens, whose leisure is employed in making known the history of his country, [2] and whose researches have already produced precious works on Picardy, we can give our readers a complete idea of the high altar of the cathedral of Amiens. The altar was of white stone, pierced by three niches intended to contain the shrines of the three saints most venerated by the diocese of Amiens; it was consecrated in 1483 by the bishop Verse, nephew of J. Coythier, physician of Louis XI. The table of black marble was 11 ft. long by 2.2 ft. wide; it was given in 1413 by a canon of the cathedral, Pierre Millet. The reredos was higher at the middle, and was covered by panels of painted wood representing the Passion, which opened like leaves and allowed to be seen the reliefs in silver executed from 1485 to 1493. Six columns of copper with shafts o ornamented by statuettes of saints were set at both sides of the altar, and bore six angels clothed in copes and holding the instruments of the Passion. Veils slid on rods connecting the three columns on each side and enclosed the sanctuary. T These veils were given in 1511 by a canon of Amiens, Jean Le-

sacred things, but it is certain that from the point of view of art, altars have lost that severe simplicity, that is the mark of good taste, since their backs have been overloaded by parasitic ornaments, since the suspensions of the holy ciborium has been replaced by the tabernable, that opens in the midst of the reredos, since the reredos itself, converted into steps, has been covered by innumerable candles and vases of artificial flowers; since the framed paintings present actual scenes to the eyes, and distract rather than edify believers. Our o opinion on such a delicate subject might at need be based on that of an ecclesiastical author, already cited many times in the course of this Article. Thiers says,[1] in speaking of these innovations, that he regards as fatal:-- "Little minds, weak minds, devotees to bad taste, who have more zeal than intelligence, and who are not prevented by respect for ecclesiastical antiquities, praise and approve these new inventions, even to saying that these sustain them, and that they excite their de devotion. As if there was no devotion whatever in antiquity; as if one could not be devoted without that; as if there were no devotion in the cathedral churches, where the tabernacles are extremely simple, as well as the altars, although embellishments are incomparably more appropriate for them than to the churches of the Regulars among others." What would then Thiers say today, when all cathedral churches themselves have allowed to be lost the venerable simplicity of their altars under decorations without even the merit of richness of materials or the beauty of form? Since the epoch in whilh our learned author wrote (1683), what sad changes in the choirs of o our mother churches, what monstrous ornamentation has replaced the earnest and simple decoration of those ancient altars, w witnesses of the most moving facts of our national history! What would Thiers have said, when seeing the chapter of the cathedral of Chartres demolish its rood screen and its altar of the 13 th century; the chapter of Notre Dame preside over the destraction of its ancient altar, its reliquaries, its tombs of bishops, that of the cathedral of Amiens replace by stucco, plaster and gilded wood the magnificent high altar, whose description we shall give later? Perhaps after that blindness, that during the course of the last (18 th) century l led the French clergy to cast into the crucible or among the

chapels at the right of the altar opposite the piscina, or in little recesses made for that purpose in the altars themselves. We shall find a sufficiently great number of altars represented in paintings and reliefs where these recesses are indicated. Here among others (19) is an altar from a relief in alabaster preserved in the museum of the cathedral of Seez, in the wall of which is opened a little niche containing the cruets.

As for the reredoses, they took a much greater importance as the taste for luxury penetrated into the interior decoration of churches. (Art. Retable). Already very rich in the 13 th century, but contained within simple and severe lines, they did not delay to rise and to dominate altars by presenting a structure of ornamentation and of figures, often of great dimensions, or a succession of subjects covering a vast field. The cathedrals alone long retained the old traditions, and d did not allow their principal altars to be smothered under t these favorite decorations. Yet justice must be done to the F French Church; it was the last to allow itself to be seduced into that way injurious to the dignity of the worship. Italy, Spain and Germany preceded us, and from the 14 th century covered their reredoses with an incredible confusion of reliefs, that soon rose to the vaults of the churches. The altars of the Spanish churches are notably surmounted by reredoses, some of which belong to the 14 th century, and a great number to t the 15 th and 16 th centuries, which excel all that the imagination can conceive of the richest and most loaded by subjects and ornamental sculptures. Without falling into that exaggeration, the altars of France at the end of the 14 th century lost the severe appearance, that they knew how to retain in the 13 th. The reredoses assumed sufficient importance (excepting as we have said, in some cathedral churches) to cause to disappear the beautiful arrangement of the altars of S. D Denis. There was no longer made that distinction between the altar and the reliquary rising behind it; all is mingled and becomes confused, the altar, reredos and reliquary now form but a single structure, contrary to the law of the primitive Church, that nothing should be placed directly over the altar, except the ciborium. It does not belong to us to decide if t these changes have been favorable or not to the dignity of s

altar. Thiers says in his Dissertations on the principal altars of churches, speaking of towers intended to contain the eucharist, that he has seen one of copper and quite old, in the choir of the parish church of S. Michel of Dijon. That c custom was very old indeed, for S. Remy, archbishop of Rheims, directed in his will, that his successor should have made a tabernacle or ciborium in form of a tower from a vase of gold weighing ten marks, that had been given to him by king Clovis. Fortunat, bishop of Poitiers, praised S. Felix, archbishop of Bourges, who attended the fourth council of Paris in 573, for having caused to be made a very precious tower of gold to contain the body of Jesus Christ. Examples abound, both of portable towers as well as of doves suspended over altars and containing the eucharist. Perhaps William Durand, in speaking of tabernacles placed on the altars, intended to designate these towers or portable pyxes, that not only contained the consecrated hosts, but also those unconsecrated and even relics of the saints; these pyxes, entirely independent of the reredos, were placed before it on the altar itself, at the moment of the communion of believers. But it must be recognized, that t the text of the bishop of Mende is quite vague, and the opinion of Thiers on pyxes or portable towers seems to us to be based on facts, whose authenticity cannot be disputed. Thiers regards the towers or caskets as not designed to contain the eucharist, but as utensils necessary for the oblation, of consecration and of communion, and he inclines to believe, that the eucharist was always reserved in a box suspended above t the altar, that this casket was made in form of a tower, a c cup or a dove. S. Udalric speaks of a golden dove continually suspended on the altar of the great church of Cluny, in which was reserved the holy eucharist. But these suspensions assumed different forms, without speaking of that represented in Fig. 8; there still exists in the treasury of the cathedral of Sens a ciborium in form of a covered cup, designed to be suspended over the altar; this ciborium dates from the 13 th century. As for the utensils necessary for the oblation, the consecration and the communion, such as the chalice, paten, flagon, cruets, veil, etc., they were preserved either in portable caskets taken to the altar at the moment of the oblation, or in little ambrys, that are generally found in the walls of

blue and red mastic; the middle presents designs of great delicacy, black, blue and red, likewise in mastic. The pavement of the chapel was of mosaic of tiles and little colored stones with small squares of white marble. (Art. Pavages). We give here (18) a perspective of this altar.

Note 1. p. 43. A part of this paving still exists; it is a mosaic composed of hard stones, porphyry, verd antique, serpentine, colored and gilded pastes, and little bits of tiles.

Note 2. p. 43. The body of the altar was cut in pieces during the restorations undertaken in 1830-1840; fortunately all those fragments still exist, and can easily be recomposed by the aid of a very complete and detailed drawing by M. Percier.

Note 3. p. 43. There is visible in the drawing of M. Percier the indication of this painting, the army of Dagobert at the siege of Picquigny, etc.

Note 1. p. 47. See melanges archeol., by fathers Martin and Cahier, Vol. 2. p. 173. (See old French text). Mss. Arsenal.285.

Note 2. p. 47. Excavations made under the existing pavement of the choir by recovering the floor slabs or old tile floors, permit with certainty the replacing of the altars drawn by M. Percier with their floors. Unfortunately these excavations c can be undertaken only successively by reason of the smallness of the annual allowance, and the altar mentioned has not yet found its place again, although its reredos and a great part of its front still exist, as well as the step.

In some of the examples given above, one does not see that the eucharist was placed otherwise than in a suspended ciborium, and we have not found tabernacles or pyxes placed on the altar to contain the consecrated or unconsecrated hosts, as William Durand states in his Rational. The custom of reserving the eucharist in caskets attached to the reredos of the principal altars does not extend back over two hundred years, and again at the end of the 18 th century, the eucharist was preserved in cases in form of pavilions or towers, or in silver doves, suspended over the main altars of great cathedrals and of monastic churches. Also frequently were the hosts brought for the communion in ciboriums, that were placed on the table of the altar at the moment of saying the mass. In this case the ciborium, the vermilion box containing the eucharist was habitually placed in a sacrarium or little sacristy near the

surrounding it and the little lamp that burns over the sacred body. One sees how the general form of this little monument is simple and dignified, in spite of the hichness of the details. As in all mediaeval works, especially before the 14 th century, we note in the small number of altars remaining to us in drawings or the monuments, and particularly in their accessories, such as reredoses, reliquaries, a great variety; what would this be if all these objects had been transmitted intact to us! The two last altars show us reliquaries placed in a very different fashion and perfectly justified by the l location. Indeed the altar (Fig. 13) of the chapel of the Virgin of S. Denis is against the wall, and to exhibit the shrine it was necessary to elevate it above the reredos, on the contrary the altar of S. Firmin is placed so that one can easily pass entirely around it (Fig. 15); the shrine then finds itself at the level of the ground, protected by a lattice. A Above it, suspended from the great table covering it,is seen the little lamp. There still exist at S. Denis a great number of secondary altars, whose accessory arrangements differ from those just given. Here among others is the altar of S. Eustache, found against the back of the first square chapel at the north above the chapel of the white Virgin (17). Here the tabernacle covering the shrine of the saint was entirely detached from the reredos, and it rests on two columns and consoles w with figures. It appears difficult to give a signification to those monsters crouching on the clothed men. Did the sculptor wish to make sirens, conforming to the texts of the bestiaries so much in vogue in the 12 th and 13 th centuries, [1] and thus recall to the faithful the danger from the enticements of the age? Among the altars of S. Denis is yet another, whose place has not been recognized, [2] but which presents great interest; it is composed of a mass of masonry entirely covered on front and sides by overlays of glass cut in lozenges, and through which one perceives towers of Castile on a scarlet g ground, fleurs-de-lis on a blue ground, rosettes and eaglets on a purple ground. At the back is a reredos also overlaid w with blue glass cut in polygons with a crucifixion, S. John and the Virgin, the Church and the Synagogue, in relief. The step of that altar is of lias with a border of fleurs-de-lis and very delicate towers of castile detached from a ground of

altars of the abbey were thus easily reestablished, and many others could certainly be so; for the numerous traces yet existing in the chapels and the fragments placed in the storehouse, show how faithful are the sketches of M. percier.

At the entrance of the apse of the abbey church on the left (north) side was formerly the chapel dedicated to S. Firmin, first bishop of Amiens and martyr. The pavement of this chapel and the step of the altar, which is very large, were of mosaic and date from the 12 th century. [1] The altar is from the beginning of the 13 th century, as well as its reredos, which s still entirely exists. [2] D. Doublet mentions the mosaic pavement of this chapel, portions of which we have recently found in place; it gives the legend of the shrine of S. Firmin captured by Dagobert, a legend painted on the front of the altar within the arcade by which it is decorated. [3] He speaks of t the shrine of gilded wood placed behind the altar, and of a certain"band of embroidery above the altar, all strung with pearls and enriched with stones, of the same length, from which are suspended 60 acorns of silver gilt." Here (14) is the face of the altar with its reredos of carved and painted stone, representing Christ at the centre with the four evangelists; at the sides are the 12 apostles with their names beneath. C Commencing at the right of the altar one reads, Simon, Bartholomew, James, John, Andrew, peter; under the Christ is Apostle; they following are Paul, Bames, Thomas, Philip, matthew and Jude. In the quatrefoil enclosing Christ is read this inscription (see Latin text). The body of the altar is composed of an arcade with foliage supported by little engaged columns, alternately cylindrical and prismatic, the whole is covered by paintings, the leaves are colored green like the capitals; the little colunms are divided into very small compartments imitating mosaics, quite like those covering the little columns of the cloisters of S. John lateran and of S. Paul-w-t-W. at Rome; the intervals between the columns are covered by legendary subjects as just stated. The table of the altar was bordered by an inscription on its edge and now lost; and on top by a mosaic in compartments. We give here (15) the plan of that altar, with the shrine of S. Firmin placed behind the b back beneath a table borne by columns; and (36) the side of t the altar illustrating the arrangement of that shrine, grilles

Behind the reredos, between the altar and the back of the chapel is a little structure beneath which one can pass, and that supports at a level above the reredos a stone tabernacle of excessive delicacy. Two octagonal rods terminate at top in l leafy crosses, are set at the sides of the reredos and receive crosses of iron gilt, from which are suspended lamps. Above the tabernacle, on a little corbel inserted in the middle column at the back of the chapel is set a pretty statue of the holy Virgin holding the Child, in white marble, half natural size; above her head is a canopy. Here (13) is a plan of this altar with the chapel in which it is placed, and (13 bis) is a view of the whole of the little monument. In the tabernacle behind the altar was placed a shrine containing the body of S. Hilary, bishop of Poitiers, and of S. Patroclus, martyr a and bishop of Grenoble. This altar, like most of the secondary altars of the abbey church of S. Denis, was erected by the care of S. Louis, when he caused the church to be restored a and rebuilt in part.

Note 1. p. 40. M. Percier, whose predilection for the arts cannot be contested, was first of all a man of taste, and better than that again, a man of feeling and sense; on returning from Italy, he saw the church of S. Denis pillaged and devastated; he could not see with indifference the scattered remains of so many monuments of art gathered during several centuries, then mutilated by ignorance or fanaticism; he set himself to work and made in the ancient abbey church a great number of sketches. These labors bore fruit, and soon aided by M. Lenoir, he saved from complete destruction a great number of these remains, that were deposited in the Museum of French monuments. We have sometimes had the pleasure of hearing M. P Percier speak of that epoch in his artist life; without perhaps knowing it, he was the first that desired to see and cause to be appreciated our old national art; the memory of the mutilated monuments of S. Denis, but which he had again set in place, had left an ineffaceable impression in his mind. At h his death, M. Vilain, his nephew and heir of his portfolios, had the courtesy to allow us to copy all the notes and sketches gathered in the church S. Denis; by means of these data so freely given, we were able to assemble and recompose the fragments from the Museum of Petit-Augustins. Some of the old ol-

artist. All the sculptures are treated with scrupulous respect for the object, that nothing approaches. Was not this indeed the nobler manner of honoring God, than to place art before all else in his sanctuary? And was there not true and just f feeling in that perfection, that the artist sought to give to the coarser material? We shall confess, that we are far more impressed by the sight of an altar of stone, on which man has exhausted all the resources of his art, that before those pieces of bronze or silver rudely wrought, whose value consists in their weight, and which rather excete cupidity than move the soul. We have already spoken of the altars of the abbey church of S. Denis, and we have sought to give an idea of what might be the altars of relics erected in its sanctuary; but this is only a restoration, whose value can be contested by anyone, yet happily several secondary altars of that celebrated church have been preserved to us in ruins, or have been given to us by precious drawings executed in 1797 by the late Percier. [1] Particularly in these altars appears the work of the artist. There are neither reredoses nor facings of gold and vermillion. Stone is the only material employed, but it is wrought with care and perfect taste, covered by painting, gilding, incisions filled with colored mastic or overlays of glass, that still add to the beauty of the work, without the value of the work ever being exceeded by the richness of the material. We shall first give the altar of the chapel of the Virgin located in the chevet on the axis of the church. This altar was erected on a floor of terra cotta (tiles) of great refinement, and that belongs to the church built by Suger, a and is set on a single stone step of lias inlaid and overlaid by mastic. The incisions, in the midst of a delicate border of black ornaments, form a diaper of fleurs-de-lis and towers of Castile on a ground of bluish-green and red. (Art. Dallage). Supported on three little columns and a richly painted back, the table of the altar is simple and is surmounted by a reredos of lias, representing at the centre the Holy Virgin crowned and holding the infant Jesus, at the right is the birth of Christ and the adoration of the Magi; on the left being th the massacre of the innocents and the flight into Egypt. These figures of remarkable execution are entirely painted on a blue ground with lozenges and sown with fleurs-de-lis in gold. Re-

Note 1. p. 37. These paintings are scarcely visible.

One will notice that the altars behind which rise the reliquaries, such as those of the abbey church of S. Denis, Notre Dame of Paris and of S. Chapelle, are so placed that beneath the reliquary is formed a sort of grotto or crypt in the lower story. At S. Denis, this little crypt was occupied by the sacred bodies; but at Notre Dame of Paris, at S. Chapelle, t the shrines are very high above the floor, as if supported in the air, so that one can place himself under them. This arrangement seems to have been adopted very early. There exists in the crypts of the church S. Denis at the north side and near the entrance to the central crypt, an arch remaining from the Carlovingian church; on one of the capitals of that arch is carved an altar (12 7), behind which is placed a little structure supporting a reliquary. A little church of the south of F France, the church of Valcabrere near S. Bertrand de Comminges has retained in its chevet, whose construction belongs to the Carlovingian epoch, an altar established quite certainly in the 13 th century according to this arrangement. The plan (12 B) of the apse of this church, the elevation (12 C) and the section (12 D) of the altar clearly indicate the little crypt placed beneath the reliquary containing the shrine. A stairway leads above the vault that receives the shrine, and the believers can pass behind the altar beneath this vault, to place themselves directly under the protection of the saint. We shall see immediately how this principle is applied to the secondary altars of the abbey church of S. Denis.

One thing is worthy of remark when one examines these precious remains, as well as those still preserved at S. Denis in such great number; this is that in the decorations of altars, in all that seems made to accompany worthily the sanctuary of churches, men were preoccupied in the middle ages and especially in France, with honoring the altar, even more by the beauty of the work, by the perfection of workmanship, than by the intrinsic richness of the materials employed. At S. Chapelle, this graceful sanctuary is only lomposed of stone and of wood; the means of ornamentation employed are of great simplicity; overlaid glass, ornaments formed in a paste of lime, paintings and gilding, have nothing expensive. The real value of this m monument is due to the extreme perfection of the work of the

Behind this altar opens an arch forming the archivolt of a v vault forming an apse and extending to the back of the apse; the great arch is accompanied and abutted by an open arcade serving as enclosure. Two adoring angels, carved and painted, are detached from the imposts of the arch, decorated by overlays of blue glass with fleurs-de-lis in gold. Beneath the p pointed curve of that arch are suspended smaller angels; the two upper ones support the crown of thorns, the four lower o ones the instruments of the Passion. The arches and archivolts at right angles and opening beneath the vault are covered by overlays of glass, by gilded ornaments and by paintings. The vault is composed of ribs also ornamented, enriched by false stones, and blue inlays with golden stars. The two little winding stairs, that ascend above the vault are of extreme delocacy and very skilfully joined woodwork. To the king of France alone was reserved the privilege of taking the monstrance containing the crown of thorns enclosed in the great shrine, and of exhibiting the very sacred relic to the congregation or to the people in the court of S. Chapelle. For that purpose, at the bottom of the great apsidal stained glass window was left a panel of white glass, so that the reliquary could be seen from outside in the hands of the king. The suspension of the holy sacrement was before the great shrine above the altar. Our engraving can give only a very feeble idea of this masterpiece in which the art far excelled the richness of the paintings, overlays and gilding. It is unnecessary to state that the great shrine was melted, and that we no longer possess b but drawings or painted representations of it. Behind the enclosure, the arcade decorating the lower wall of the S. Chapelle continues, only at the right, beneath the first window is executed a piscina of exquisite workmanship (Art. Piscine); on the left is an ambry. Two of the 12 apostles, whose statues were set against the piers, are placed beside the two stairs; these are statues of S. Peter and S. Paul. Above the little rear altar, under the wall arch of the vault of the platform, is painted a crucifixion, the moon and two figures, one of which is crowned and is probably S. Louis. Two steps lead to the principal altar.

Note 1. p. 35. Hist. d.l.S. Chapelle roy. du palais, by M. S. Jerome.Morand. Paris. 1690.

Note 1. p. 32. Thiers wrote this in 1688.

Note 2. p. 32. In explicat. divin. Offic. Chap. 85.

Note 3. p. 32. Chapter 15.

Note 1. p. 33. Cast taken from the cabinet of M. Alfred Gerente. This ivory appears to belong to the first half of the 13 th century, and to Rhenish in style.

Note 1. p. 34. Rational. Chap. 3. Vol. 2.

Note 2. p. 34. By reason of this tradition we still see again on the walls of some churches paintings imitating suspended hangings. (Art. Peinture).

The altar of the upper S. Chapelle of Paris does not seem to have been arranged to be veiled, and the structure supporting the great reliquary was placed behind and not above it. We give here (11) the plan of that altar and of its surroundings. The altar appears to be contemporaneous with the S.Chapelle (1240 to 1250); as for the platform on which is placed the great shrine, and all the remains of which are now replaced, it evidently dates from the last years of the 13 th century. Four columns supporting angels of gilded bronze were p placed at the four angles of the enclosure of the altar; but these columns were erected under Henry III. At the back of t the apse and behind the main altar was placed a little altar B; according to ancient custom this little altar was designated by the name of rear altar. That was the altar of relics, as at the cathedral of Paris, at Bourges, Chartres, Amiens, Arras, which had only a secondary place, the principal altar having over it only the suspension of the eucharist. Here is the perspective view of this altar (12) with the platform, t the two little stairs of painted and gilded wood, that led to the vaulted platform and the great shrine in vermilion, placed on a base of gilded wood, surmounted by a canopy likewise of wood, enriched by gilding and painting.

We shall enter into some descriptive details relating to th this altar and its very important accessories, preserved in the Museum of the Augustins, and now restored to their places. The altar exists no longer, but drawings and a very good engraving forms a part of the work of Jerome Morand, [1] that give us an accurate idea. This altar was very simple; the table w was composed of a moulding enriched with roses, supported by a back and three little columns, not surmounted by a reredos.

covered by that little structure, still designated in Italy by the name of ciborium; while during the Romanesque period until the middle of the 13 th century, there is found in the reliefs, paintings, stained glass or the vignettes of manuscripts, little structures borne on columns and covering the altar, like those one can yet see at Rome in the church of S. Clement, S. Agnes(without the walls), S. George in Velabro, at Venice in the church S. Mark, etc. Yet from the time of W William Durand, as thiers states, veils are still placed before altars in Lent, and William Durand wrote his Rational at the end of the 12 th century. "It is to be stated," says he, "that three sorts of veils are suspended in the church, namely; that covering covering the sacred things, that separating the sanctuary from the clergy, and that separating the clergy from the people. The first veil, i.e., the curtains hung at the si-sides of the altar, and whose secret the priest penetrates, has been formed after what one reads in Exodus (34). Moses p placed a veil over his form, because the children of Israel could not bear the splendor of his face. The second veil or curtain, that is stretched before the altar during Lent and the celebration of the mass, takes its origin and form from that suspended in the tabernacle, separating the holy of holies from the holy place. This veil concealed the ark from the people, andit was woven with admirable art, and ornamented by beautiful embroidery of different colors, and it was rent in the Passion of the Lord; in imitation of it, the curtains are still woven in different beautiful colors. The third veil took its origin from the enclosure of a wall or the tapestry, that in the primitive church extended around the choir and rose o only to the height of the support, which is yet observed in certain churches. [2] But on Good Friday all the veils of the church are removed, because that in the Passion of the Lord, the veil of the temple was rent. The veil separating the sanctuary from the clergy is drawn or removed at the hour of vespers on each Saturday of Lent, and when the office of Sunday is commenced, so that the clergy can see into the sanctuary, because Sunday recalls the memory of the resurrection. That is why this also takes place during the six Sundays following the feast of Easter."

Note 4. p. 31. Rational. Chap. 18. I, II.

or the columns supporting them. It is only necessary to read the lives of the Popes written by Anastasius the Librarian to be convinced of this, and especially those of Sergius I, Gregory III, Zachariah, Adrian I, Leo III, Paschal I, Gregory IV, Sergius II and Nicholas I; it will be seen that these sovereign pontiffs caused to be made in various churches of Rome, in some 25, others 8, and in most 4 veils of costly fabrics to be hung around the altars; to be suspended from the ciboriums of the altars; to be attached to the arches of the ciborium around the altars." William the Librarian, who added the lives of five Popes, namely of Adrian II, John VIII, Martin II or Marin II, Adrian III and Stephen VI, to those of Anastasius ending with Nicholas I, again speaks of the same veils in the life of Stephen VI, where he says that this Pope gave a veil of linen and three other veils of silk to be placed a around the altar of the church of S. Peter at Rome." Thiers, who rarely seeks his documents except in the texts, does not seem certain, that in the churches of the West were veils before the altars. But the fact does not appear doubtful to us, at least in a certain number of dioceses. Here (10) is as proof a copy of an ivory of the 13 th century,[1] on which the f front veil of the altar is perfectly visible. In this little sculpture, that we give at actual size, the priest is seated in a pulpit under a canopy; before the altar are also seated three clerics, and the front veil is raised. The suspension of the holy sacrement is fastened under the ciborium. One sees on the table of the latar only a book laid flat, the Gospel; clerics hold three candles on the right side of the altar. We find analogous examples in stained glass, in manuscripts and sculptures from the 11 th to the 13 th centuries. Later the veils before the altars are rare and are no longer found at the West, except at the sides and between the columns, as shown in Figs. 7, 8 and 9. It would appear that front veils ceased to be used to conceal altars of churches in the West during consecration, when the Greek schism was established. Also at that epoch the ciborium or canopy directly covering the altar ceased to be found in the churches of France, and was no longer replaced by the closing of the side lateral curtains. Indeed in all monuments of the end of the 13 th century, as w well as those of the 14 th and 15 th, the altar is no longer covered by that little structure, still designated in Italy

he adds, that the use of these four colors is not absolutely rigorous; according to him scarlet may be substituted for red, violet for black, byssus color for white, and saffron for green. It is probable that the facings of altars were subeject to these rules, as well as ecclesiastical vestments, and it is necessary to distinguish them from the coverings or red, gray and black cloths, mentioned by the bishop of Mendes in his Chapter 3, as cited above. In changing the color of ecclesiastical vestments according to the different times of the year, the clergy also changed, as still practised today, the color of the facings of altars, when these facings were made of fabrics. That was done with the veils and curtains surrounding the altars; these hangings were variable. We will add on the subject of veils and curtains, that they were not uniformly arranged in the middle ages around the altars. "Besides that today," says Thiers (Chap. 14), [1] "there are few ciboriums above the altars outside Italy, there are no altars that have veils or curtains entirely around them. The truth is that in some old churches, both secular and regular, the principal altars have veils at the right and left sides; but they neither have them in front nor in rear, because behind are reredoses, paintings or images in relief, and that the f front is entirely open, unless in Lent when veils are placed there as mentioned by Beleth,[2] Durand, [3] and the use of Citeaux. [4] In other churches the altars have no veils at all, although apparently they had them formerly, or at least at right and left, which is recognized by the pilasters or columns of wood or of copper, that are seen there at present. Finally, there is an infinity of altars, that not only have no veils whatever, but which do not even seem to have had them formerly, having no vestige of pilasters or of columns. Yet there were some around ancient altars, in the churches of the East as in those of the West, and they were kept unfolded and closed at least during the consecration and until the elevation of the sacred host, so as to produce greater veneration of t the divine mysteries." After an extended dissertation on the custom of veils placed before Greek altars, Thiers terminates his Chapter by saying:--"With regard to the churches of the West, we have existing proofs, how the altars were there surrounded by veils attached to the ciborium, to their arches

chevet of that church, and which is represented in the Annales archaeologiques of M. Didron from a painting preserved in the sacristy, presents an arrangement analogous to that of the altar in the chevet of Notre Dame of Paris, only that the reliquary is suspended above the altar, fastened to the two end piers of the apse, and that it is reached by a little stairway of wood placed on the right of that altar.[1]

Note 1. p. 31. Ann. archaeol. Vol. 8. We cannot do better than to refer our readers to the engraving given by Lassus a and Gaucherel.

The custom of placing facings before the altars, although ancient, was not uniformly adopted in France. This explains why after the 12 th century some tables of ancient altars are supported by massive blocks, while others rest on little columns enriched by sculptures, arcades, slabs of stone or marble overlaid or carved. De Moleon observes [3] "that in the chapels of the cathedral of Angers, the altars (according to the ancient custom still remaining to us on Good Friday, and not long ago on Good Saturday also) are bare, and are not covered with anything; so that only a moment before saying mass thereon, cloths are placed on them, which hang over them like that placed on a dining table, and there is no facing." The most common form of the altar during the middle ages, whether with f facings or not, is that of a table or chest.

Note 3. p. 31. Page 79.

It is certain that the beautiful altars of the chapels of the abbey church of S. Denis in France, drawings of which we shall give later, and so many others, supported on columns or presenting faces richly decorated by carvings, paintings and overlays, were not intended to receive facings; while that already very early certain altars were furnished with them. The high altar of the cathedral of Rheims had a facing partly of fine gold, partly of vermilion, given by archbishops Hincmar and Samson des Pres. The altars of relics of the church of S. Denis was likewise covered on the front by a facing of gold enriched by precious stones, that had been given by Suger. B But most frequently the facings were of costly fabrics, for the fronts of altars as well as for the reredoses. William Durand [4] admits for ecclesiastical vestments only four principal colors:-- white, red, black and green; it is true that

Note 1. p. 28. Diss. ecèles. s. l. princ. autels d'eglises. Chap. 14.

Note 2. p. 28. See Ann. archeol. Vol. 9. p. 1, the Art. of M. Lassus and the notes of M. Didron, as well as the engraving executed from a copy of that painting.

Note 3. p. 28. We owe the preservation of this drawing to M. Lassus, who during the life of M. Garnerey made a copy of it. This drawing is represented in Ann. archaeol. Vol. 9.

The high altar of the cathedral of Paris, which is represented in an engraving of 1662,[4] is arranged like that of the cathedral of Arras. Four angels holding the instruments of t the Passion are placed on four columns of copper supporting rods on which slide the curtains. At Notre Dame of Paris the altar was very simple, covered by a facing as well as the reredos; behind the altar rose the great reliquary containing the shrine of S. Marcel. "Primarily," says Father Du Breuil,[5] "behind it and above the high altar, on a broad table of stone supported by 4 great and very high pillars of the same material is placed the shrine of S. Marcel, ninth bishop of Paris, which is silver gilt, enriched by an infinity of great pearls and precious stones. Higher that that is a very great cross, whose crucifix is of silver gilt."

Note 4. p. 28. Entrez triomphante de leurs majestes Louis XIV et Marie-Therese dans la ville de Paris. Folio. Paris. 1662.

Note 5. p. 28. Theat. des antiq. de Paris. By F. Jacques Du Breuil. p. 36.1612.

Beside this reliquary was another altar:-- "On the right s side," continues Du Breuil," on the altar of the Trinity called Ardents, is the shrine of Notre Dame of silver gilt. On the left of the said altar (principal) is a shrine of wood, having only the front covered by silver gilt, in which is the body of S. Lucain, martyr. Above the said altar of the Trinity are several shrines."

After the engraving just mentioned, here is the view of the principal altar of Notre Dame of Paris, with the shrine of S. Marcel suspended beneath its great canopy.(9). This high altar appears to have been erected toward the end of the 13 th century; perhaps it was contemporary with the enclosure of the choir, which dates from the beginning of the 14 th century.

The altar of relics of the cathedral of Arras placed in the

at the top at the edge of the table. Above the altar is only a facing for a reredos, and above is an image of the Holy Virgin in silver gilt. Behind is a bar of copper, and at the top is a crucifix of gold 1 1/2 ft. in height, at the foot of which is another bar of copper, that projects about 1 or 1 1/2 ft. over the altar, at the end of which is suspended the holy ciborium, according to the second council of Tours.(Latin text). "At S. Ouen of Rouen,"the great altar is very simple, separate from the wall curtains at the side, a railing of wood, four p pillars and four above, like that of the cathedral church. A Above the reredos is suspended the holy ciborium (at the foot of the cross), and the images of S. Peter and of S. Paul, the first patrons, between two or three wax candles on each side. There are three lamps or basins before the great altar with three wax candles, as at the cathedral." J. B. Thiers, [1] clearly demonstrates, that the custom of enclosing the altars by veils, still retained from his time in some churches, was general in the first centuries of christianity. We give here a copy of the high altar of Arras (8), represented on a painting of the 16 th century, preserved in the sacristy of that church.[2] This altar was certainly of the 13 th century, excepting the upper part of the suspension, the cross that appears to belong to the 15 th. This charming monument was constructed partly of white marble and partly in natural or gilded silver. The rear pier behind the reredos was of marble enriched by some gilding, and it bore a statuette of the Virgin under a dais crowned by a crucifixion in silver with S. John and the Virgin; three a angels receive the precious blood of our Lord in little cups. Behind the niche of the Virgin was an angel in vermilion sounding the horn. A cross of vermilion to which was attached an angel with wings unfolded supported the holy ciborium suspended by a small chain. On the reredos were placed the reliquaries. Six columns of silver and vermilion bor six angels in whose hands are distinguished the instruments of the Passion. In the painting of the sacristy of Arras, the altar and the reredos are covered by facings sown with fleurs-de-lis. We do not know how the reredos was decorated under the facing; as for the altar it presented a very remarkable arrangement, one that we reproduce[3] in the engraving after the drawing of the late Garnerey.

A delightful painting by Van Eyck, preserved in London in the collection of lord --- gives us the arrangement and form of the upper parts of this altar; beneath the table of the altar is concealed by a rich covering of tapestry.(7). Here is found the reredos given by Charles the Bald and the golden cross given by abbot Suger. [1] The painting of Van Eyck is executed with a delicacy and accuracy so remarkable, that are distinguished even the least details of the reredos and the reliquary. The characters peculiar to the different styles are observed with scrupulous fidelity. It is evident that the reredos belongs to the 9 th century, the columns, the angels and the reliquary to the end of the 13 th century.

Note 1. p. 27. A representation of this cross may still be seen in the treasury of S. Denis, engraved in the work of D. Felibien; as for the reliquary of vermillion, the Huguenots seized it, when they took S. Denis.

D. Doublet gives in chapter 45 of his Antiquities de l'abbaye de S. Denis a minute description of the golden reredos of this altar, which entirely corresponds to the painting of Van Eyck; he mentions the quality and number of precious stones and pearls, their position, and the accessories accompanying the personages.

William Durand seems to admit, that all the altars of his time were surrounded by veils and curtains, and indeed the examples given by the descriptions or representations painted or drawn (for unfortunately of all these monuments not a single one remains standing) supports his text. From the time of Moleon in 1718 there still existed a number of altars retaining their ancient arrangement. That author cites that of S. Seine of the order of S. Benedict. [2] "The great altar is without a reredos. There is only one step and six candlesticks are on it. Above is a crucifix 8 ft. high, beneath which is suspended the Holy Sacrement in the ciborium, at the two sides of the altar are four columns of copper, and four angels of copper with candlesticks with wax candles and great curtains. "At S. Stephen of Sens (the cathedral), the same arrangement. At the cathedral of Chartres," the great altar is very wide; it has no railing but only columns of copper and angels above around the sanctuary. The facing is attached to cloths half a foot on the altar; the fringe of the facing is entirely at

top at the edge of the

brass, as follows:-- (See Latin text). [1]

Note 1. p. 22. In the plan that we give here, the altar is erected at A over a crypt or confessio, the episcopal throne is at B.

Note 2. p. 22. In this plan, the altar is at A, the episcopal throne then at B.

Note 1. p. 24. Antiq. d. l. Abb. d. S. Denis in France, by F. J. Doublet. 1625. Book 1. p. 289 et seq.

This very minute description of the altar of relics of the abbey of S. Denis shows, that if the reliquary was important and as rich in ornamentation as in material, the latar placed before it retained the simplicity of the primitive forms, that this altar was independent of the reliquary, that the three shrines of the saints were so placed as to extend beneath the table, and the upper coffins arranged in the great tabernacle with three aisles were false, and merely recalled to the eyes of believers the presence of the sacred bodies, that they could not see. Without pretending here to make a restoration of that remarkable altar, we still believe it necessary to give a sketch as accurately drawn as possible from the description, so as to make the text intelligible to all. (6). [2] This altar and its reliquary, placed at the back of the apse of the abbey church, were not surrounded by a special enclosure, for the sanctuary was itself enclosed and elevated above the floor of the nave and transept by about 10 ft.; it was only accompanied by two ambrys at right and left, containing the treasures of the church.(Art. Armoire). As for the morning altar placed at the extremity of the axis of the crossing and almost against the tribune formed by the elevation of the sanctuary, it was surrounded by iron grilles "made in beautiful compartments," composed of a marble table borne by four pillars of white m marble; it had been consecrated by Pope S. Stephen. [1] At the end of the 15 th century, this altar was again surrounded by columns of vermilion surmounted by fimures of angels holding torches and connected by rods on which slid the curtains. Behind the reredos, which was of gold, had been erected the shrine containing the relics of king S. Louis.

Note 2. p. 24. We give at A the plan of this altar and reliquary drawn from dimensions given by D. Doublet.

Note 1. p. 28. D. Doublet. Chap. 38.

extends beneath the altar, that is the place where repose the sacred bodies of the apostles of France, S. Denis the Areopagite, S. Rustic and S. Eleutheros, in shrines of silver of v very ancient fashion, hanging on chains and buckles of silver, to open which are three keys of silver. Above the said sarcophagus is a great tabernacle of woodwork of the said length and breadth in form of a church with high nave and low vaults, having eight parts, i.e., for each of the two gables four, t two at the round corners 2 1/2 ft. high, and the two others in the work 6 1/2 ft. high, also furnished with bases and capitals; and between them three recesses and forms of semicircular windows supported their arch, that of the middle, higher than the others; the top of the piers of the internal work in the manner of a nave of a church of the said length and 2 1/2 ft. wide, bearing at one side and the other six little free columns, and two at both ends with base and capital of ancient fashion, above the said nave and the little columns of each side is a shed roof in the manner of low chapels, vaults and aisles, the sides and centres semicircular and supporting four cloister vaults; for each of the two gables of the said nave five little windows, three at the top with two little square isolated piers, and below are two with a round pillar in the midst; the interior of the nave filled below by the form of a coffin, and the two sides also filled below with a similar form of a wooden coffin of the length of the said tabernacle, that of the middle more elevated than the others. The front of the coffin of the middle adjoining the said altar is decorated by a border at bottom of several beautiful enamels on gilt copper, like overlays of various kinds, and above the said enamels several beautiful agates, some in fashion of cameos with faces of men (cameos) and the others like bezels. All the front of that altar is covered with gold, and enriched by beautiful round panels from the Orient, aqua marinas in the bezel, topazes, garnets, sapphires, amethysts, carnelians, prisms of emeralds, enamel overlays and cassidonies, with three beautiful crosses set on the apex of each gable of the s sarcophagus, that of the middle being of gold, the others of silver gilt, enriched with beautiful sapphires, beautiful amethysts, garnets and prisms of emeralds. At the back of the said sarcophagus this verse is written in letters of gold on

and which belonged to the primitive Church, must necessarily prevent the establishment of side altars or reredoses, for t those would have concealed the celbrant. Thus one scarcely s sees the reredos appear except on attached altars, on those of chapels, rarely on the principal altars of cathedrals. In monastic churches, there was always the morning altar, at which was said the ordinary office, placed at the entrance of the sanctuary at the end of the choir of the religious, and the altar of the relics, located at the back of the sanctuary, and behind or beneath which were preserved the shrines of the saints. Thus were established the principal altars of the church S. Denis in France from the time of abbot Suger. At the back of the apse the illustrious abbot had erected the reliquary containing the shrines of the holy martyrs, before which was placed an altar. Here is the description given by D. Doublet for that remarkable monument. "In that part is the very holy altar of the glorious holy martyrs (or indeed the altar of the sacred bodies, because their bodies rest beneath it), which is of gray porphyry of perfect beauty; all the part above or surface of the same altar is covered with fine gold, also enriched by several beautiful agates and precious stones. There one sees an excellent table covered with gold (a r reredos), ornamented and embellished by precious stones, which king Pepin formerly had made, that is square, and on the four sides are letters in enamel on gold, one after the other in these terms:-- (See Latin text). At the back of this altar is the sacred sarcophagus of the bodies of the holy martyrs, that has a height of 5 1/2 ft. from the pavement, is 8 ft. long by 7 ft. wide, made of a course of black marble of one ft. height all around, and on the said course are eight square piers also of black marble 2 1/2 ft. high, and on these 8 piers is another layer of black with several old mouldings, and between the said 8 piers are eight panels of metal lattices, encased in wood, in several beautiful patterns, 2 1/2 ft. long, the pier in the middle behind and likewise the pier at one corner of said back, each covered by a band of gilt copper, also these lattices and woodwork are covered by gilt copper leaves, with several round enamels on gilt copper, and several gilt nails on them; and on the marble of the coping, within the said sarcophagus a vault of stone covered inside by gilt copper, which

the law. After the second lesson and response, the gray veil is taken away, which designates the time under the law. After the third lesson, the third veil is removed, which signifies the epoch of grace, in which by the Passion of Christ, entrance for us was and is still opened to the holy of holies and eternal glory."

However lengthy these quotations, their importance and value will be understood; they cast great light on the subject now occupying us. While the clergy maintained the ancient traditions, and until the moment when it was carried away by the rather disordered taste of the 16 th century, it knew how to preserve the altar in its primary signification. The altar r remained the visible symbol of the old and of the new law. E Each part composing it recalled the Holy Scriptures, or the great acts of the primitive Church. Always simple in form, whether its material were precious or common, it was surrounded by all that must make it appear sacred to the eyes of believers, without these accessories taking from it the character of simplicity and of purity, that the false taste of the last centuries have removed from it.

We shall attempt, either by the aid of the texts, or by the help of the monuments, to give a complete idea of the altars from mediaeval churches. But first it is necessary to establish a distinction between the different altars. In cathedral churches, the high altar was not only of very simple form, b but it was often without a reredos, only enclosed by veils a and curtains, surmounted at the back by a column with a cross, from which was suspended the holy eucharist. At the sides were placed ambrys in which were enclosed the relics; sometimes i instead of suspension, on the altar was placed a rich tabernacle, as William Durand informs us, destined to contain the wafers, consecrated and unconsecrated. However it is to be p presumed, that these tabernacles or caskets were not fixed to the altar in any permanent manner. On the altar itself was a arranged only the cross and two candles. Until the 13 th century the thrones of the bishops and the stalls of the canons regular were generally arranged in the chevets of cathedrals; the episcopal throne occupied the centre. This arrangement is still retained in some Roman basilicas, among others at S. J John Lateran, S. Lawrence-w-t-W, (4),[1] S. Clement (5),[2] etc.

be covered with them as by a vestment." There is also placed on the altar itself in certain churches the tabernacle, of w which he spoke in the chapter on the altar.

Note 3. p. 19. Rationol. Chap. 2. William Duraud, bishop of Mende, died at the end of the 13 th century. Translated by M. C. Barthelemy. Paris. 1854.

At the corners of the altar are placed permanently two candlesticks, to signify the joy of the two peoples that rejoice in the nativity of Christ; these candlesticks, between which is the cross, bear small lighted tapers; for the angel said to the shepherds:-- "I announce to you a great joy for all t the people, because today for you is born the Saviour of the world."

The front of the altar is again decorated by a golden fringe, according to the word in Exodus (Chaps. 25, 28):-- "Thou shalt build me an altar and shalt surround it by a garland f four fingers in height."

"The book of the Evangel is also placed on the altar, because the Evangel was published by Christ himself, and that he himself gives witness for it." In speaking of the veils, the bishop of Mende thus expresses himself:-- "It is to be stated that three sorts of veils are suspended in the sanctuary, namely: that covering of sacred things, that separating the sanctuary from the clergy, and that separating the clergy from the people. The first veil, i.e., curtains hung at the two sides of the altar, and whose secret the priest penetrates, have been made after what is read in Exodus (34). The second veil or curtain, that extends before the altar in Lent and during the celebration of the mass, derives its origin and fo form from that suspended in the tabernacle, and that separated the holy of holies from the holy place. This veil concealed the ark from the people, and it was woven with admirable art and ornamented with beautiful embroidery of different colors; and in imitation of it, the curtains are still woven of very beautiful colors."

"In some churches the altar in the solemnity of Easter is decorated by precious coverings, and above it are placed veils of three colors; red, gray and black, which designate the three epochs. The first lesson and the response being finished, the black veil is removed, which signifies the time before t

hearts of men. There was also placed a vase of gold filled w with manna to attest, that God had given from heaven bread to the children of Israel, and the rod of Aaron to show that all power comes from the Lord God, and Deuteronomy as a sign of the covenant by which the people had said:--"We will do all that the Lord shall say to us." And because of that the ark was called the Ark of Witness or of the Testament, and because of that again, the tabernacle was called the Tabernacle of Witness. Now there mas made a propitiary or covering of the ark. It is an imitation of that, that in certain churches is placed on the altar an ark or a tabernacle in which are placed the body of the Lord and the relics of the saints. Then," adds William Durand later," by the altar it is necessary to understand our heart, and the heart is in the middle of the body, as the altar is in the middle of the Church. On the subject of this altar the Lord gave this order in Leviticus:-- "The f fire will always burn on my altar." The fire is charity; the altar is a pure heart. The white linen covering of the altar represents the flesh or humanity of the Saviour." William Durand terminates his chapter on the altar by saying that the altar should never stripped nor covered with gloomy cloths or thorns, unless on the day of the passion of the Lord(which he adds, is now reproved by the council of Lyons), or when the Church is unjustly despoiled of its rights. In his Chapter 3 (on paintings, etc.), he says:-- "Images of the holy fathers are sometimes painted on the reredos of the altar. The ornaments of the altar are caskets and shrines, hangings, phylacteries, candlesticks, crosses, golden fringes, banners, books, veils and curtains. The casket in which are preserved the consecrated hosts signifies the body of the glorious Virgin. It is sometimes of wood, of white ivory, of silver, of gold, or of crystal. The same casket, when containing the consecrated hosts and unconsecrated wafers, designates the human memory; for man must continually remember the good received from God, both the temporal things, which are represented by the unconsecrated wafers, and the spiritual represented by the consecrated hosts. And the shrines placed on the altar,which is Christ, these are the apostles and martyrs; the tapestries and linens of the altar are the confessors, virgins and all the saints, of whome the Lord said to the prophet:-- "Thou shalt

mysteries. Which gave occasion to remove them and to replace them where they were before. And at the same instant the miracles continued to occur." William Durand in his Rationel des divins offices (Chap. III, p. 25), which dates from the 13 th century, allows the shrines of saints on the altar. He says:- "And the shrines placed on the altar, which is Christ, are the apostles and martyrs."

William Durand in his Rational, that cannot be read and meditated too much, when one desires to know the Catholic middle ages,[3] enlarges at length on the altar and the significance of the various parts composing it. He says that according to the Scriptures, "the altar had many parts, namely the top and the bottom, the interior and the exterior. The top of the altar is the Divine Trinity and also the Church triumphant. The bottom of the altar is the Church militant; it is again the table of the Temple, of which it is said; "pass the days of feasts in the holy repasts, seated near the table at the place of the altar." The interior of the altar is the purity of the heart. The exterior of the altar is the fire or the altar of the cross itself. In the second place, the altar signifies the spiritual Church; and its four corners are the four parts of the earth over which the Church extends its empire. Thirdly, it is the image of Christ, without which can be offered no gift in a manner pleasing to the Father. That is why the Church is accustomed to address its prayers to the Father by the mediation of Christ. Fourthly, it is the form of the body of the Lord; fifthly, it represents the table on which Christ drank and ate with his disciples. He follows, "that one reads in Exodus the declaration that was deposited in the ark of the Testament or Witness, i.e., the tables on which were inscribed the witness, one might even say, the evidences of the Lord to his people; and that was done to show that God had restored in writing on the tables the natural law inscribed in the

the representation of the altar of the gallery of the church of Montreal near Avallon, whose table rests on a single column, is open beneath and is pierced by a small hole. [1] "The great altar of the cathedral of Lyons," says de Moleon in his Voyages liturgiques,[2] "is enclosed by a very light balustrade of copper, about two ft. high, and it ends at the level of the back of the altar, which is about five ft. wide. The altar, whose marble table is slightly hollowed on top, is very simple, only ornamented b: a cloth in front and another on the reredos above. On this reredos are two crosses at the two sides; Scaliger says that none were there in his time."

Note 2. p. 16. See Dissert. eccles. sur les princ. autels des eglises, by J. B. Thiers. Paris. 1688. We cannot do better than to refer our readers to that curious work, full of learned research.

Note 3. p. 16. Fig 1 gives the altar of the chapel of the Virgin of the church of Montreal (Burgundy), this altar is of the 12 th century. Fig. 1 is the high altar of the church of Bois-S.Marie; this altar is of the 11 th century. A is the base with the insertion of the little columns, B is the capital of the middle column; C is the base of one of the four columns. We owe this drawing to the courtesy of M. Millet, architect of the curious church of Bois -S-Marie.

Note 4. p. 16. "Nothing leads us to believe," says Thiers in his Dissertation, etc., p. 42, "that relics of the saints were placed on the altars before the 9 th century; no canon, order, rule, example, nor evidence of ecclesiastical writers, persuades us of this; or if one placed them there, the saints from whom they came were offended thereby, and caused them to be removed. Even in the 10 th century, some saints believed that there was irreverence in placing their relics on the altars. Here is an example that cannot reasonably be disputed. Berman I, abbot of Cluny reports (in S. Odon, abbot of Cluny, book 2), "that immediately that one had placed for only a few days the relics of S. Gauburge on the altar of a church of his name near Cluny, the miracles done there ceased, and that this saint having appeared to one of the sick, that implored his aid, said to him that the reason for which he did not recover his health, was because some one had placed his relics on the altar of the Lord, which should only serve for the divine mys-

in the middle ages were placed on certain occasions rather on the altar than beneath it. [4] There exist no longer in France, that we know, complete altars of a certain importance preceding the 1■ th century. Those found represented in the manuscripts or in reliefs before that epoch are very simple, nearly always without a reredos, composed only of a table supported by columns and covered by cloths falling to the ground at both sides. The custom of the reredos is however very old, for example the golden reredos given by the emperor Henry II to the cathedral of Basle in 1019, and now preserved in the Museum of Cluny (Art. Retable); the great reredos of gold, enameled and enriched by precious stones placed on the high altar of church S. Mark of Venice, known under the name of Pala d' Oro (golden spade), a part of which dates from the eud of the 10 th century; that formerly preserved in the treasury of S. Denis. The altar was consecrated from the first centuries, no image could be placed on it in presence of the eucharist; but the reredos not being so, it could be covered by representations of holy personages, by scenes from the Old and New Testaments. Except in certain cathedrals, from the 12 th century altars are then surmounted by very rich reredosesl and frequently are of great dimensions. As for the tables of altars, until the middle of the 12 th century, they are frequently in the form of a slab, open beneath. S. Remi, archbishop of Lyons, gawe to church S. Stephen during the 9 th century an altar of marble with table about 2.4 ins. thick, with small holes at each corner. [1] D. Mabillon reproduced in the 3 rd volume of his Annales Benedictini an altar table seven palms long by four wide, given by abbot Tresmirus to his monastery of Mt. Olivet of the diocese of Carcassonne, likewise open beneath and covered by inscriptions and carved ornaments, with the four symbols of the evangelists at the four corners. [5] The g great table of the high altar of church S. Sernin of Toulouse was found several years since in one of the chapels, and is preserved in that church, was also surrounded by a rich border of ornaments and was open beneath; this table appears to b belong to the first half of the 12 th century. It seems that these tables were hollow and pierced with holes, so as to be wasted without fear of the water reaching the ground, and which might carry particles of the sacred elements. Here (3) is

went. [3] Hincmar, a bishop of Rheims died in 882, and permits in his Capitularies the use of portable altars [4] of stone, m marble or mosaic. During the 11 th and 12 th centuries, these portable altars became very common; they were carried on journeys. So the Roman Order terms them "traveling tables." The inven tories of the treasuries of churches make frequent mention of portable altars.

Note 1. p. 15. See Latin text.

Note 2. p. 15. Chapter 2.

Note 3. p. 15. Ducange, Glossary.

Note 4. p. 15. Chap. 3. See Latin text.

On the tables of permanent altars, it was the custom before the 9 th century to overlay the propiatories, which were plates of gold or silver, on which was offered the holy sacrifice. Anastasius the Librarian says in his Life of Pope Paschal I, that the sovereign pontiff caused to be placed a proprtiary of silver on the altar of S. Peter of Rome, one on the lintel of S. Praxede, others on the altars of S. Maria Cosmedin and the basilica S. Maria Maggiore. Pope Leo IV likewise caused to be made a propitiary weighing 72 lbs. of silver and 80 marks of gold for the Basilica of S. Peter.

The primitive altars, that were of stone, wood or metal, w were hollow. The golden altar erected by archbishop Angelbert in the Church of S. Ambrose of Milan was hollow, and the relics it contained could be seen through an opening pierced in the back. [1]

Note 1. p. 16. Ughellus. Vol. 4.

Bishop Adelhelm, who lived at the end of the 9 th century, relates that a soldier of king Bozon, who had become blind, had recovered his sight by slipping under the altar of the church of Mouchi-le-neuf in the diocese of Paris, during the celebration of the mass. The monuments come in that respect to support the numerous texts, that we believe it useless to cite; [2] ; the oldest altars known are generally supported on one or several columns. [3] (1 and 2). Most of the Greek altars were borne on a single column. The custom of hollow altars or those resting on isolated supports was retained till the 15 th century. The altar was only regarded until then as a table on which were sometimes placed holy relics, or that was erected over a crypt enclosing a sacred body, for truly reliquaries

to discover and reproduce a species of wood possessing such precious qualities. (Art. Charpente).

AUTEL. Altar.

All that can be said of the altars of the primitive Church is, that they were indifferently of wood, stone or metal. During the times of persecution, altars were frequently wooden tables, that could be easily transported from one place to a another. The altar of S. John Lateran was of wood. The emperor Constantine having restored peace to the Christian Church, S. Sylvester caused to be placed on exhibition in that basilica the wooden altar, that had served in the times of trial, with the prohibition for any one to say mass at it, excepting the Pope. These wooden altars were made in the form of a chest, i.e., were hollow. S. Augustine relates that Maximin, bishop of Bagai in Africa, was killed under an altar of wood, that the Donatists threw on him. Gregory of Tours often uses the word archa instead of ara or altar to designated the alter. These wooden altars were covered,by precious materials, gold, silver and precious stones. The altar of S. Sophia of Constantinople given by the empress Pulcheria, consisted of a table of gold ornamented by precious stones.

It has been customary for several centuries to offer the holy sacrifice on altars of stone, or if the altars are of wood or of any other material, it is necessary for it to have at the middle a consecrated slab of stone or portable altar. It does not appear that consecrated portable altars were admitted before the 8 th century, and one could say the mass on altars of gold, silver or wood. Theodoret, bishop of Cyr, who lived during the first half of the 5 th century, celebrated the divine mysteries on the hands of his deacons, at the request of the holy hermit Maris, as he states in his religious History. [1] Theodore, archbishop of Canterbury, died in 690, and he stated in his Penitential, [2] that one may say mass in the open field without a portable altar, provided that a priest or deacon, or even that says the mass, holds the chalice and the oblation in his hands. Portable altars seem to have been imposed in case of absolute necessity from the 8 th century. Bede in his History of the English speaks of portable altars, that the two Ewalds took with them everywhere they

pastoral staff, as a symbol and not an attribute. The lamb, pelican, phoenix and lion are figures symbolical of the divinity, but are not attributes; the keys in the hands of S. Peter area symbol, while the X cross in the hands of S. Andrew, the chalice in those of S. John, the sword with S. Bartholemew and square with S. Thomas, are attributes.

On the monuments of Roman antiquity are frequently found represented objects like the instruments of sacrifice on the temples, arms on arches of triumph, masks on theatres and chariots on hippodromes; nothing analogous is in our Christian edifices of the middle ages (see Decoration, Ornament), whether religious, civil or military. It is only at the epoch of the Renaissance, when the taste for imitation of antique arts prevailed, that sacred or secular edifices were covered by attributes; W when religious instruments were sculptured or painted on the surfaces of churches; on the walls of palaces were trophies or emblems of festivals, frequently even objects borrowed from paganism and no longer in use in the society of that epoch. A s strange confusion of ideas indee, that combined on the frieze of a church the heads of victims with cups or chalices, on the piers of palaces being Roman shields and cannon.

AUBIER. Sapwood.

This is the white and spongy part of the wood of the oak found directly beneath the bark and surrounding the heartwood. S Sapwood has neither durability nor solidity, its presence having the inconvenience of producing worms and starting the decay of the wood. Ancient carpentry is always entirely free from sapwood, and so is well preserved. There formerly existed in the forests of Gaul a species of oak now exhausted, which possessed the advantage of yielding timbers of great length, straight and of nearly equal diameters from bottom to top; this oak had little sapwood under its bark, and was employed whole without splitting. We have seen many of these timbers in carpentry executed during the 13 th, 14 th and 15 th centuries, simply squared with the axe and sometimes leaving bark on the angles, with scarcely any sapwood. It would seem to us a considerable advantage

Saints), or at least these attributes have no character peculiar to each personage; thus the prophets generally bear scrolls; our Lord and the apostles have rolls or books;[1] martyrs have palms. The Holy Virgin is one of the sacred personages, that one earliest sees accompanied by attributes. (Art. Vierge, sainte). But the figures that accompany the divinity or the holy personages, virtues and vices, are rather symbols than attributes, properly so called. Attributes are scarcely introduced in the art of sculpture, except when the art inclines toward realism at the beginning of the 14 th century. Then o one sees the saints represented as holding in their hands the instruments of their martyrdom, secular persons with objects indicating their rank or state, their tastes or passions.

Note 1. p. 13. "And note," says William Durand, "that the p patriarchs and the prophets are painted with rolls in their hands, and certain apostles with books, certain others with rolls. Doubtless because before the coming of Christ, the faith was shown in a figurative manner, and that it was enclosed by many obscurities within itself. To express that, the patriarchs and prophets are painted wit rolls, by which is designated in some sort an imperfect knowledge; but as the apostles were perfectly instructed by Christ, that is why they can use books by which is fitly designated the perfect knowledge. Now as certain among them have written what they have learned, to cause it to serve for the instruction od others, that is why they are properly represented like doctors with books in their hands, such as Paul, Peter, James and Jude. But the others h having written nothing permanent or approved by the Church, are represented not with books but with rolls as a sign of t their preaching." He further adds; "The confessors are represented with their attributes, the bishops mitred, the abbots hooded, and sometimes with lilies denoting chastity; the doctors with books in their hands, and virgins with lamps (according to the Evangelist)"

William Durand, Rationale. Translated by M. C. Barthelemy. Paris. 1854. Chap. 3.

It is essential in the study of the monuments of the middle ages to distinguish attributes from symbols. Thus for example, the demon under the form of a dragon found sculptured under the feet of most statues of bishops, biting the end of the

capitals of the choir of the church of Vezelay (first years of the 13 th century); (7) capitals from the gallery of kings of Notre Dame of Paris (same epoch). Then we finally give (8) the section of the astragal adopted almost without exception during the 13 th century; a section conformable to the method then common, that serves as a drip moulding for the column.

Note 1. p. 11. A is from the crypt of church S. Leger at S Soissons; B from the crypt of church S. Denis in France; C f from the nave of church S. Menou. (Bourbonnois).

Note 2. p. 11. Cathedral of Langres.

Note 3. p. 11. Old spire of cathedral of Chartres.

Note 4. p. 11. Chapter hall of Vezelay, A; church of Montreal, B. (Burgundy).

Sometimes in edifices of the transition, the astragal is ornamented; in the choir of the cathedral of Paris, some capitals of the triforium have astragals composed of a row of small water-leaves (9); later yet one again finds decorated astragals, particularly in Normandy, as may be seen in the choir of the cathedral of Mans (10). during the 14 th century astragals become thinner and their sections less accented. (11). In the 15 th century on the contrary they assume heaviness and dryness, like all sections of that epoch; they have a strong projection that contrasts with the excessive slenderness of the little columns or vertical prisms.(12). It is unnecessary to add, that at the moment of the Renaissance, the Roman astragal reappeared with the imitations of the orders of antiquity.

ATTRIBUTS. Attributes.

These are objects taken from the material order accompanying certain sculptured or painted figures in order to make them recognized, or introduced in the decoration of edifices to ma mark their purpose, sometimes also the motive causing their erection, to recall certain events, a memorial of the persons contributing to their execution, of of saints to which they are dedicated. Grecian and Roman antiquity has lavished attributes in its sacred or secular monuments. The middle ages u until the epoch of the Renaissance, on the contrary, showed itself miserly with that ornamentation. The divine personages, apostles and saints are but rarely accompanied by attributes until about the middle of the 13 th century (Arts. Apotre, S Saintr), or at least these attribut

limestone into a greater or smaller number of courses. Stone was employed as furnished by the quarries; thus the natural height of the layers had a considerable influence on the architectural forms of edifices of the same epoch. (Art. Construction.

ASTRAGALE. Astragal. Half Round.

This is the moulding that separates the capital from the s shaft of the column. In the Roman orders, the astragal was a part of the shaft; it is composed of a cove, fillet and torus. (1). This form is generally followed in edifices of the first time of the middle ages. The shaft of the column bears the a astragal; but from the 12 th century the astragal is often s seen to belong to the capital, so as to avoid the considerable cutting away for the shaft compelled by its projection. When the column is diminished or swelled, this recessing is evidently only on a part of the shaft; but when the column becomes a perfect cylinder, i.e., with equal dimeters from base to t top, dating from the first years of the 13 th century, the a astragal without exception became a member of the capital. I Its section varies from the 10 th to the 16 th centuries, both in form and dimension. In edifices of the Carlovingian epoch, relatively to the height of the capital and the diameter of the column, the astragal assumes a greater importance than in the Roman orders; the cove is reduced for the benefit of the torus or entirely disappears (2), [1] or indeed is replaced by an ornament. The form of the Roman astragal forming a part of the shaft of the column is particularly retained in the c countries where antique monuments remained standing. At Autun, Langres, in Burgundy, Provence, Auvergne, the astragal habitually retains its primitive members till the 13 th century; only during the 12 th century they become more refined, and the cove instead of joining the shaft, is separated from it by a slight projection.(3). [2] Sometimes in that epoch of care in the execution of mouldings, the torus of an astragal, instead of presenting a semicircular section, is flattened (4), [3] composed of delicate mouldings, or is of polygonal section.(5). [4] As the sculpture of the capital becomes more elegant and more undercut and the diameters of the columns become greater, astragals lose their primitive coarseness and are really detached from the shaft. Here (6) is an astragal from one of the capi-

destroyers of 1793.

We still find a sufficiently complete series of the liberal arts represented beneath the porch of the cathedral of Freiberg-in-Breisgau. There the names of the figures are painted under the feet of the statues. That collection is then precious, because with the manuscript of Herrade it can facilitate the explanation of figures sculptured elsewhere, and which a are accompanied by attributes. Thus at Freiberg dialectics appears to count on her fingers, rhetoric holds a branch of flowers, medicine looks through a bottle, philosophy crushes a dragon beneath her feet; it is crowned.

It is evident from the examples given here, that in the great cathedrals, at the end of the 12 and beginning of the 13 th centuries, the liberal arts occupied an important place; indeed at that epoch, the study of philosophy, of sciences and letters, was in great honor, and on our monuments the personifications of the liberal arts are found in equality with the saints, the representations of the virtues, the parable of t the wise and the foolish virgins. The idea of forming an entirety of the arts, of making them all subjects of philosophy, was further happy and it properly explains the encyclopedic tendencies of the elevated minds of that epoch.

ASSEMBLAGE. Joint. Connection.

By this word is designated the connection of the members in carpentry.

ASSIZE. Course. Layer.

Each layer of stone, rubble or bricks in a structure takes the name of course. The height of the courses varies in edifices of the middle ages according to the quality of the materials at the command of the builders. Everyone knows that limestones are found under the soil and arranged in beds more or less thick. The mediaeval architects had the good sense to m modify their construction according to the natural height of these beds. Thus they avoided that waste of stone so serious today, when one assumes to subject the stone to an architectural form frequently not in accord with the natural beds of stone. The builders preceding the epoch of the Renaissance did not know sawing, that permits the division of a bed of limestone into a greater or smaller number of courses. Stone

(10). The first figure on the right represents medicine (probably); it is looking through a vase (11). The second is painting (12); the only statue represented as a man, drawing with a stylus in form of a nail on a pentagonal tablet. The third is geometry (13). The fourth is astronomy (14). It is proper to state that the disk held by this statue of astronomy is i intersected by a double broken arrow (?), same as Sens. (No, this represents the bar of an astrolabe for observing the sun). At Chartres angels hold disks divided in the same way. Is this a mode of representing solstices? We leave this task for each one to solve. The fifth is music. (5).

On the plinth of the statue of Christ, that decorates the mullion of the cathedral of Paris, were sculptured the liberal arts. On one of the columns serving as supports of the beautiful statues of the northern porch of the cathedral of Chartres (about 1240), may be seen represented the philosopher, (16), the architect or geometry (17), and the painter (18); h he holds in his left hand a palette, on which appear to be p placed thick colors; in the right hand he held a brush of which nothing remains but a bit of the handle and hairs on the palette. The physician (probably) (19); plants grow from beneath his feet; the upper part of the figure is mutilated. [1]

Note 1. p. 9. There are laws prescribing very severe punishments for those mutilating public edifices; the cathedrals o and churches, that we know, are not excepted. Yet daily children leaving the schools throw stones at their sculptures at certain hours, and that over the entire area of France. It h has sometimes occurred to us to complain of that savage custom, but the complaint of a disinterested individual is scarcely heard. The magistrates charged with the urban police would render a service to arts and artists and also civilization, if they execute in that respect the laws in force. It is indeed done with regard to the unreasonable destruction of game. Now for some of us if not for every one, a relief is worth as much as a partridge, and the laws are usually enforced, however small be the number of those whose interests are protected. (Art. 257 of the code Napoleon, penal code). All mutilations of such curious and frequently beautiful figures, that we have given here, are more due to the hands of children leaving our public schools, than to the hammers of the destroy-

the end of the 15 th century or the beginning of the 16 th, for example like the cosmographies, were represented a great number of these figures, that we see carved on the plinths of our cathedrals, and which were intended to familiarize the m minds of the people not only with the history of the Old and New Testaments, but also with philosophy and what was then c called physics, or the natural sciences. In the cosmographie universelle of Sebastian Munster [1] we find woodcuts reproducing the natural curiosities sculptured in many of our churches of the 12 th century, and to cite only a single example, Sebastian Munster gives on page 1229 of his collection the man wit the big foot, that is carved on the base of the central doorway of the cathedral of Sens (5),[2] and here is what he says; (see Italian text). Then strange figures, that we a are too easily disposed to regard as fancies of artists, had their places in the encyclopedic cycle of the middle ages, a and antique authors most of the time bear the blame of this natural history, scrupulously reproduced by our painters or sculpturs of the 12 th and 13 th centuries, in order to make known to the people all the works of creation. (Art. Bestiare).

Note 1. p. 4. Sei libri dello cosmog. Univ. Seb. Munstero. Edit 1563.

Note 2. p. 4. We give here a copy of this engraving taken from the Chapter entitled "Delle maraviglìore etc."

But let us return to the liberal arts. One of the most beautiful collections of liberal arts represented is to be seen on the western portal of the cathedral of Laon (from 1210 to 1230) on the voussoirs of the great left opening above the p porch. There the figures are ten in number. The first on the left represents philosophy or theology (6). This statuette holds a sceptre in the left hand, [1] in the right being an open book, above being a closed book. It is to be presumed that the closed book represents the Old Testament, and the open b book the New. Her head is not crowned as at Sens, but is left in a cloud; a ladder extends from her feet to her neck, and r represents the series of steps to be climbed to attain to the perfect knowledge of the queen of the sciences. The second upward represents grammar (7). The third is dialectics (8), a serpent serves as a girdle. The fourth is rhetoric (9). The fifth is arithmetic, the statuette holds balls in both hands,

them, if not all, are easily recognized by the attributes accompanying them. Music strikes three bells with a hammer; on her knees is placed a harp with eight strings; viols are suspended beside her. Under music writes Pythagoras; he holds an eraser in the left hand. Arithmetic bears in his right hand a winged dragon and in his left a sceptre. Gergert writes under his dictation; he dips his pen in his inkstand. Rhetoric discusses; quintilian placed beneath her cuts his pen. Geometry holds compasses and a square; Archimedes writes. Philosophy holds an open book on her knees; Plato appears to speak. Astronomy looks to the sky and bears a compass as in the manuscript of Herrade. Ptolemy holds a cylindrical object in each hand. Grammar holds a rod in her right hand, an open book in her left; two pupils crouch at her feet; one studies and the other holds out his hand to receive punishment; his figure g grimaces. Beneath grammar writes Chilon. We give (1) a copy of this last sculpture from the 12 th century, remarkably treated. Chilon is very attentive; leaning over his desk, he uses the eraser; at his right are pens placed on a shelf.

Note 1. p. 2. Desc. de la cat. de Chartres, by Abbe Bulteau, 1850.

The liberal arts are not always seven in number. They are found represented in a larger or smaller number. At the central doorway of the cathedral of Sens, that dates from the end of the 12 th century, the arts and sciences are twelve in number; unfortunately most of these reliefs carved in the plinth on the left are so mutilated, that one cannot designate all of them. Grammar is distinguished; medicine (probably) is represented by a figure holding plants; rhetoric, who seems to speak; geometry, painting drawing on a tablet placed on her knees; astronomy (2); music; philosophy or theology (3); dialectics (?)(4). Beneath each figure is carved a real or fabulous animal, or some prodigious monster, such as may be seen in Fig. 4. We distinguish a lion devouring a child, a camel, griffin, elephant bearing a tower, etc. It should not be forgotten, that the encyclopedic spirit predominated at the end of the 12 th century, and that in great sacred monuments like cathedrals, men sought to summarize all knowledge in the epoch. This was a book open to the multitude, who found elementary instruction there on the stone. In the first books printed at

ARTS (Liberaux). Liberal Arts.

The monuments of the 12 th and 13 th centuries frequently represent the sever liberal arts. The beautiful manuscript e encyclopedia entitled Hortus deliciarum, composed in the 12 th century by Herrade of Landsberg, abbess of the convent of Hohenberg (S. Odilia) in Alsace, and preserved in the library of Strasburg, [1] contains among its vignettes a personificati- on of philosophy and the seven liberal arts. Philosophy, the principal figure is represented as seated; seven statuettes spring from her breast, which are the seven liberal arts; gr- ammar, rhetoric, dialectic, music, arithmetic, geometry and astronomy. This figure occupies the centre of the vignette, and is crowned by a band from which project three heads; the three names of ethics, logic and physics are above them; ben- eath her feet write Socrates and Plato; this legend accompan- ies them. "Philosophy teaches one to seek the nature of the universe." Around the circle enclosing the principal subject are traced seven compartments in which are represented these seven principal arts. At the top grammar is represented as h holding rods and a book; next from the left to right, rhetoric holds a stylus and tablets; dialectics has a dog's head and this legend; "Argumenta sine concurrere more camino." Music bears a harp, cithara; before her is a sort of viola called lira; behind her is a hurdy-gurdy designated by the word or- ganistrum. Arithmetic bears a semicircular rod in which is a row of black balls, a sort of abacus still in use in the East; geometry has compasses and a ruler. Astronomy holds a bowl f filled with water, probably to observe the stars by reflecti- on; above the bowl are represented the stars. Four pagan poets are seated beneath the angle of the arts; they hold pens and penknives or erasers; on their shoulders a black bird (uncle- an spirit) seems to inspire them.

Note 1. p. 1. See notice of Hortus deliciarum by M. A. Le Noble; Liby. of Ec. des Chartes. Vol. 1. p. 238.

The right doorway of the western facade of the cathedral of Chartres presents the liberal arts sculptured on its voussoirs. Each science or art is personified by a seated woman; below her is a man writing on a desk (scriptionale) placed on his knees. Abbe Bulteau in his Description of the cathedral of Chartres, [1] designates each of these figures; indeed most of

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By

EUGENE EMANUEL VILLOET-LE-DUC

Government Architect

Inspector General of Diocesan Edifices

Volume II

From Arts to Chapiteau

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wood, inserted at the origin to prevent the rupture of a flaw. In fragments of ancient structures employed in the Gallo-Roman epoch to build walls of cities were often found indents, that indicate the frequent use of dovetails of iron or bronze. We have found wooden ones in the Romanesque structures of the first epoch. Sometimes also the separation of capitals of engaged columns adjoining square piers of the 11 th and 12 th centuries was prevented by a false cutting in form of a d dovetail. (2). It is the same for corbels with strong projection and intended to bear a corbelled load. (3). But it is p particularly in works of carpentry, that the dovetail has been used during the middle ages. The tie-beams of trusses in the carpentry of roofs in the 13 th, 14 th and 15 th centuries are generally fixed on the double plates by dovetails and by halving, (4), so as to prevent the thrust of the principals forming the truss and resting on those plates by a tie from o one to the other. (Art. Charpente). The use of tenons and mortises was not common in woodwork before the 15 th century, th the parts of doors and timbers are frequently connected by d dovetails let in halfway. (5). In thes case the joiners took care to select for the dovetails very hard and tough woods, such as elm, the knotty parts of walnut or oak.

The architects of the 15 th and 16 th centuries used and abused the stone dovetail to hold great corpellings, to suspend keystones of vaults, or ties receiving arches without the aid of a support. (6). (Arts. Clef, Pendante, Voute). Dovetails of stone have the inconvenience of breaking easily at the weak place; the stone having no elasticity, the least movement in the blocks that these ties connect, breaks them and renders t them useless.

End of Volume 1.

that can be obtained by those, who have followed their steps during war. Already ennobled by their acts, they have the merit of nobility, if they do not have the title; and we proceed the more freely to bestow it on them, because by this means we supplement what might be lacking in the perfection of preceding laws, in establishing in our realm a military nobility, that can be acquired by right of arms, without special letters of nobility. King Henry IV had the same object in Art. 25 of the decree on the taxes, issued in 1600."

Note 1. p. 503. Decree of Nov. 1750.

The institution of the military orders had created in the 12 th century confraternities sufficiently powerful to alarm the kings of Christendom. This was feudalism, no longer a rival and separated, but organized, armed and able to dictate the hardest conditions to sovereigns. The monarchical power, after having broken this association, desired to restore it and make of it a rampart; it instituted in the 15 th and 16 th centuries the orders of S. Michel and of the Holy Spirit, in the 17 th the order of S. Louis, and yet later Louis XV established the order of military merit a short time after publishing the decree, of which we have given an extract. These institutions effaced the last shields of arms. Henceforth the nobility must be recognized by a general sign, and no longer by individual marks. The monarchy to place all nobility in the same rank, to cover it with the same mantle, whether it was ancient or new, and the night of Aug. 4, 1789, saw the destruction by the constituent assembly of escutcheons, which had been veiled by the royal power, were for the multitude only the tokens of unjust privileges, no longer the memorial of vast services h rendered to the country. The royal escutcheon of Louis XIV had covered all those of the French nobility; in the day of danger it found itself alone, it was shattered, and this should be so.

ARONDE; QUEUE D'. Dovetail.

A kind of cramp of metal, wood or stone, having the form of a swallow-tail doubled, that serves to hold together two stones, to connect two timbers in carpentry, plates or planks. This kind of cramp was employed in all antiquity. When the obelisk of Luxor was taken down for removal to France, there was found under the base of that block of granite a dovetail of w

Castres, etc. Some cities even bore France, particularly in Languedoc. Guilds generally took as arms figures taken from t the trades they practised; it was the same for the ennobled citizens. In Picardy many arms of the 15 th and 16 th centuries have puns or canting arms, but most of these arms belonged to families from the industrial or commercial classes of that province.

It was at the end of the 13 th century under Philip the Bold, that appeared the first letters of nobility in favor of a goldsmith named Raoul.(1270).[2] Afterwards the kings of France largely used their prerogative; but they could not make the ancient nobility regard these newly ennobled as gentlemen. The arms of the new nobility, no longer composed in the camp facing the enemy, but by some herald in the depth of his study, had not that originality of appearance, that clearness and f freedom in the distribution of the tinctures and figures, that we find in the arms of the ancient nobility.

Note 2. p. 502. President Henoult, Abrege chron. do l'Hist. de France.

At the beginning of his reign Louis XV went beyond his predecessors in instituting the military nobility.[1] The considerations preceding that decree again indicate respect for nobility by race, and the tendencies of the monarchy, henceforth master of feudalism."The great examples of zeal and courage that the nobility of our realm has given in the course of the last war, state these considerations, have been so worthily followed by those, who have not had the same advantages in t the matter of birth, that he shall never lose the memory of the generous emulation with which we have seen them fight and conquer our enemies; we have already given them authentic evidences of our satisfaction by rank, honors, and other recompenses, that we have granted them; but we have considered that these favors, persnal to those who have received them, will one day be extinguished with them, and nothing has appeared to us more worthy of the kindness of the sovereign, than to cause to pass to posterity the distinction , that they have so justly acquired by their services. The most ancient nobility of our states, that owes its primary origin to the glory of arms, will doubtless see with pleasure, that we regard the communication of its privileges as the most flattering reward;

bearing their hereditary arms. These, to distinguish their shields from those of the secular members of their family, placed above them the episcopal cap or mitre, while the nobles placed no sign over their arms. [1] The episcopal cap and the cardinal's cap have the same form, only the former is green and has only ten acorns in cords at each side, placed 1, 2, 3 and 4; while the latter is red and the cords each end in 15 acorns, placed 1, 2, 3, 4 and 4.

Note 1. p. 501. Some as beforeo Liby. Imp. No. 8351.; also Oeuvres choisees of king Rene, by count de Quatrefonds. Angers. 1835.

Note 1. p. 502. At Vezelay, 13 th century; in cathedral of Carcassonne, 14 th century, etc.

From the 13 th century painted or sculptured decoration admits into edifices a great number of heraldic figures, and t the arms exert an influence on artists until the beginning of the 16 th century. Monumental painting rarely employs during the 13 th, 14 th and 15 th centuries any but the heraldic colors; it does not model its ornaments, but as in blazonry places them flat by outlining by a black line. The harmonies of heraldic painting are found everywhere during these epochs. We shall develop these observations in Art. Peinture, to which we refer our readers.

A great number of stained glass windows of the epoch of S. Louis have as borders and even as grounds fleurs-de-lis and towers of Castile. At Notre Dame of Paris two portals of the facade present in their plinths fleurs-de-lis incised. It is the same on the portal of church S. Jean-des-Vignes at Soissons. The middle mullion of the principal doorway of the church of Semur in Auxois, which dates from the first half of the 13 th century, is covered by the arms of Burgundy and fleurs-de-lis carved in relief. At Rheims, Chartres, the stained glass of the cathedrals is filled with fleurs-de-lis. At the c cathedral of Troyes one finds in the stained glass of the 14 th century the arms of the bishop, those of Champagne. The c cities and guilds also even assume arms; the good cities, that were particularly associated with the efforst of the royal po power to free itself from feudalism, had the right of placing in chief the arms of France; such were the arms of Paris, Amiens, Narbonne, Tours, Saintes, Lyons, Beziers, Toulouse, Uzes,

brilliant fashion during a tournamen with head covered by a helmet chested by some singular emblem, under the name of the knight of the unicorn, dragon, etc., used this helmet as a c crest for the shield of arms of his family, during a certain time or during his life, if new prowess caused forgetfulness of the former. It was only at the end of the 15 th century, that were adopted for the crests as for the arms, forms indicating the degree of nobility or titles of nobles. (Arts Lambrequin, Timbre). Only in the 17 th century the arms of France were covered or enclosed in a pavilion or tent, i.e., by a canopy and two curtains, this support or enclosure being reserved afterward for emperors and kings. See how these arms were blazoned:-- azure with three fleurs-de-lis, two and one, the shield surrounded by the collars of the orders of S. Michel and of the Holy Spirit, crested by a helmet entirely open, of or; above the closed crown imperial with eight rays, much elevated by a double fleur-de-lis of or, which is the c crest; for supporters two angels cald in the coat of arms of France; the whole covered by the royal pavilion of France, l lined with ermine, and for device:-- "Lilies neither labor nor die." Under Henry IV and Louis XIII, the shield of Navarre was combined with that of France, and one of the angels was clothed in the coat of arms of Navarre. Until Charles V the fleurs-de-lis were without number on a field of azure; that prince reduced their number to three in honor of Holy Trinity. From the 17 th century dukes and peers enclosed their arms in a pavilion, but with a single curtain. As we have already seen, the origin of that enclosure is the pavilion into which the p participants in the tourney retired before or after the entry into the lists, and is not the imperial, royal or ducal mantle; it is then nonsense to place the crown above that pavilion, f for on the contrary the pavilion should cover the crown; and indeed in the first arms painted with the pavilions, the crown is placed on the shield and the pavilion encloses the whole. That error, that we see continued, indicates how essential it is in the matter of arms to know the origin of all the principal or accessory parts, that must compose them.

The regular and secular clergy, like a feudal lord, adopted arms after the 13 th century; i.e., abbeys, chapters, and bishops had their arms; which did not prevent the bishops from

Saturday of the year during the reception of the subscribers. Then came to the said pavilion a young squire of Burgundy named Gerard de Rossilon, a fine man, tall and straight and of a good height; and the said square addressed himself to Charles the herald, requesting him to open to him; for he wished to touch the white shield, with the intention to fight the knight challenger with the axe, until the giving of 25 blows. The s said herald opened to him, and the said Gerald touched; and a report of this act was sent to Jacques de Lalain, who sent to him to take a day." [1] One can again see in that custom the origin of the hangings, that seem to uncover the shield. It is also necessary to state, that from the 15 th century the helmets of the knights who were to joust were covered with fabrics or painted and gilded leather, pinked at the edges; this sort of covering that accompanies the crest over the shield, and which falls down at both sides, seems to be the principle of that accessory, that one finds joined to arms during the 15 th and 16 th centuries. (See old French text). [1] We have already seen at the beginning of this Article, that the knights and princes presenting themselves within the lists to joust adopted fanciful arms, and but exceptionally appeared with their hereditary arms. The arms of the family were taken too seriously to subject them to the chances of combats, that were merely a sport. It is curious to read on this subject the Memoirs of Oliver de la Marche, very expert in such matters. "On the other hand," says he, [2]. (See old French text).

Note 1. p. 499. Memoir of Olivier de la Marche. Book 1. Chap. 21.

Note 1. p. 500. Traite de la forme et devis d'un tournoi. T The order of the book of the tourney by king Rene. Liby. Imp. No. 8351.

Note 2. p. 500. Book 1, Chap. 21.

On the eve of the tourney the participants were invited to deposit their arms, helmets, crests and banners at the house of the judges. These arms were deposited under the porticos of the court, and were examined by the judges to make an assignment of them. (See old French text).

These crests surmounting the shields of arms, like the supporters and holders, were only variable accessories during the course of the 15 th century. A noble that had jousted in bril-

said chain on which was inscribed; cesar gave me this. And h henceforth the king, by his own motion bore as a device the flying stag with neck crowned with gold, and wherever his arms were placed, two stags supported his arms at the sides. 1380." Then Gharles VII, Louis XI and Charles VIII retained the winged stags as supporters of the royal arms. Louis XII and Francis I assumed as supporters, the first porcupines and the second salamanders, which were the animals of their devices. From the 14 th century, nearly all families of the French nobility adopted supporters for their arms; but that custom had nothing rigorous, and according to circumstances the supporters of the arms often changed. Some family, that had as supporters of i its escutcheon savages or Moors, causing them to be painted in a chapel, changed these secular figures into angels. The arms of Savoy, for example, already mentioned, were supported by an angel on one of the doors of the monastery of S. Francis at Chambery with this motto:-- "Cross faithful among all." The arms of cities, from the 15 th century, were represented with supports, Avignon had two gerfalcons with this device; "With claws and beak."Frequently the supporters were supplied by t the name of the family; thus the house of Ursins had two bears as supporters. The supporters are sometimes varied, the kings of England have as supporters of their arms, at the right a l leopard crowned, armed and langued in blue, on the left a unicorn of silver held by a crown and fastened by a chain of or passing between the front paws and returning to the back. But these supporters are later than the union of Scotland with t the kingdom of England; before that epoch, the supporters of the arms of England were a lion and a dragon, the last symbol because of the order of the garter dedicated to S. george.

During the tournaments and before the entrance within the lists, it was customary to exhibit the arms of the combatants on rich tapestries. Perhaps this is the origin of hangings on which were painted the arms after the 15 th century. When a champion presented himself at the passage of arms, under certain cirmumstances his shield or targe was suspended in a pavilion, that it was necessary to open for it to be touched by those registering themselves for the joust. "The first Saturday of the month of May of the year 1450, the pavilion was p pitched, according to the custom, and as always continued each

deniers of Philip de Valois he represented as seated on a folding chair, holding his sword up in his right hand, his l left resting on the shield of France. On the rose nobles and the nobles of Henry of England, that prince is represented as standing in a ship up to the middle of the body, holding up in his right hand a sword, in his left a shield quartered with france and England. On the angels of the shield is attached a cross, that takes the place of the mast of a vessel. Taking the part for the whole, there was soon given to theis coins of gold the name of golden shields (ecus).

It is again a fashion of supporters, that consistr in having the shield supported by mooss, savages, real or fabulous animals. The origin of that custom is found in the tournaments. The knights had their lances, helmets and shields borne by p pages and valets disguised as strange persnages of animals. To open the passage of arms the givers of the tourney had their shields hung on trees on the main roads or at certain assigned places, so that those desiring to combat against them might touch the shields. To guard them were placed dwarfs, giants, Moors, men disguised as monsters or wild beasts; one or more heralds of arms took the names of those who touched the shields of the givers. At the celebrated tournament that occurred at Chambery on May 1, 1346, Amadeus VI of Savoy hung his shield on a tree, and caused it to be guarded by two great lions, that from that epoch became the supporters of the arms of Savoy, that prince probably chose these animals for supporters, because Chaplais and the duchy of Aosta, his two principal l lordships, had lions for arms. The shields of arms, helmets, crests and devices of the knights prominent at that tournament, were deposited to the number of twenty and remained for three centuries in the great church of the fathers of S. Francis at Chambery; it was only in 1660 that the good fathers removed that precious monument, when they had their church whitewashed.

Charles VI appears to be the first of the kings of France, tha had his shield and device borne by supporters. Juvenal of Ursins relates, "that this prince going to hunt at Senlis, pursued a stag with a chain of gilded copper on his neck; he desired this stag to be taken with ropes without killing it, which was done," and it was found that he had on his neck the

In the examples given, we have chosen for the shields the form generally adopted in the 13 th, 14 th and 15 th centuries,[1] a form modified in the 16 th and 17 th centuries; to t them was then given a wider form often terminated at the point by a brace.

Note 1. p. 497. It does not appear that fixed rules were adopted in the 13 th and 16 th centuries for the form and proportions to give to shields; they are more or less long in regard to their width, or more or less square; some existed in t the 13 th century in paintings of the church of Jacobins of Agen, for example, that terminate in a semicircle at the point.

Married women bore doubled shields; the first shield gave the arms of the husband, and the second their own. For the s shields of daughters was adopted from the 14 th century the form of a lozenge.

Accessory figures accompanied the shields of arms. From the end of the 14 th century are frequently seen shields sustained by supporters and holders, sometimes surmounted by crests, b bells, and detached on hangings.

The support is a tree on which is suspended the shield; the holders are one or two figures of men at arms, knights, covered by their armor and the armorial coat of arms of the shield. The origin of this mode of accompanying the shield is found in the tombs of the 13 th and 14 th centuries. In the abbey church of Maubuisson, before the altar of S. Michel was to be seen at the end of the last (18 th) century the tomb of Clarembard de Vendel, on which that personage was represented as covered by a coat of mail with his shield placed on the body, with four charges. There still exists in the crypts of the c church S. Denis a great number of statues of princes of the blood royal, deceased at the end of the 13 th or the beginning of the 14 th centuries, which are represented in the same manner, reclining on their tombs. We shall cite among others that of Robert de France, count of Clermont, lord de Bourbon (brought from the Jacobins of Paris), having his shield supported by a sling and inclined from the left side, bearing France (old) with cotice of gules; that of Louis de Bourbon, g grandson of S. Louis, the same; that of Charles of Alencon, whose shield bears France (old) with border of gules and charged with sixteen bezants, itc. (Art. Tombeau). On the gold d

the towers have no donjon but only battlements, one should s say crenelated by so many pieces.

Opened is said when the doors or windows of towers or castles are in a tincture different from the building. The same terms apply to other buildings. Essore is said of a building, whose roof is of a different tincture.

A ship is said to be fretty, dressed, when equipped with a all its rigging and sails. Paris (115) bears gules with ship fretty and dressed in argent, floating on waves of the same, on the chief a band of ancient France. If the ship is without masts and sails, one says ship anchored. When the anchors are painted in other tinctures, they must be specifieda The trabe is the cross-piece, the stange is the stem, and the guemenes are the cables to the anchor.

We shall not enter into more ample details concerning the various instruments or buildings that appear on arms; we refer our readers to special treatises.

Break in terms of blazon is a change made suddenly in arms to distinguish the branches of the same family. Breaks occurred in the origin only by the change of all pieces, only retaining the tinctures. Thus the counts of Vermandois, coming from the house of France bore checkered with or and azure, w with chief of France. Later a break was made by changing the tinctures and retaining the pieces. The oldest branch of Maille bears or with three mullets of sinople; the Maille of Burgundy bears gules with three mullets of or; other branches bear or with mullets of sable, or, with three mullets of azure. Breaks are also made by changing the position of the charges or omitting some of them. But the manner of the break most co common in France consisted in adding a new charge to the full arms of the family. From the end of the 13 th century the princes of the blood of the house of France broke in that manner, and they chose as breaks, charges that did not change the principal blazon, such as the label; Orleans bears of France a and label with three pendants of argent on break; -- border; Anjou bears of France with border of gules, short baton' Bourbon bears of France with short baton as band of gules;-- canton, rowel of spur, crescent, star, bezant, shell, little cross, the three-quarter or cinquefoil. Breaks also occurred by quartering with the arms of an allied family.

tincture as the flower. Among the stars, those earliest employed were the sun, stars and crescent. The sun is always or. When it is in color, it takes the name of shadow of sun. The position of the crescent is ascendant, i.e., its horns are turned toward the chief of the field. When its horns turn toward the point of the shield, it is said to be inverted; turned, when toward t the right flank; contourned toward the left flank. Again one speaks of the number of crescents and their position, that t they are turned en band, adossed, appointe, affronte, badly arranged. The star usually has five points, it must be specified in blazoning. X bears gules with three stars of eight r rays in or, 2 and 1. The rainbow is always painted in natural colors in fess, slightly curved.

Note 1. p. 494. See Art. Fleur-de-lis.

The elements are fire, earth and water, and are presented in different forms, the fire is a flame, lighted torch, brand, burning charcoal; the earth is represented in the form of mountains, rocks, terraces; water in form of waves, springs, r rivers.

The artificial figures entering into arms are; 1, the instruments for sacred or secular ceremonies; 2, the vestments or ordinary utensils; 3, arms for war or hunting; 4, buildings, towers, cities, castles, bridges, gates, galleys, ships, etc.; 5, instruments of the arts or trades. It is necessary, following the usual method, to designate these different objects by their names in blazoning, to mark their location, their number and the tinctures of the different attributes, that they may receive. Des Lis (113) bears azure, a sword of argent paly w with point upward, surmounted by a crown and at sides with t two fleurs-de-lis of the same.

Among the arms most commonly represented on old shields are distinguished swords, cimitars (short, broad and curved swords), arrows, lances, axes, maces, stirrups, spurs, rowels of spurs, helmets, horns, hunting horns, spears, nets, etc.

castles are sometimes surmounted by turrets, and one then says summed by such; masoned is said when the joints of the stone are indicated by a different tincture. The kingdom of C Castile (114) bears gules, a chateau summed by three towers of or, masoned, opened by azure.

Towers surmounted by one turret are said to be donjoned. If

treating of this matter, one finds some vestiges of a drawing not compelled to suffer alteration, since the arms are signs, whose principal merit is to perpetuate a tradition. Especially in the monuments of the 14 th century do we seek these types, for during that century the heraldic and adopted figures, whose very distinct character was reproduced without sensible modification until the artists, accustomed to an ordinary imitation of nature, no longer understood the fundamental laws of decoration applied to monuments, furniture, arms or clothing. Here then are some of these figures.

We commence with the lion rampant (96); A crowned; passant or leoparded (96); issuant (98); Leopard (99); wolf passant (100); ravening when standing on his hind legs; stag (101); wild boar (102); spread eagle (103); eagle with wings abased (103 bis); martlets (104); eaglets without beaks or feet (105); bass (106); dolphin (107); Bull head (108); siren (109); dragon (110); griffin (111).

Plants, trees, flowers and fruits are frequently employed on arms. If these are trees, they are designated by name. Nogaret bears; argent with walnut tree of sinople torn up, i.e. the roots are visible and detached on the field of the shield.

Some trees are represented in a conventional manner. Crequi (112) bears or with sloe tree of gules. Trunks of trees cut down and without leaves are termed "chicet". (stumps). When leaves are placed on the field, their number and species are indicated.

It is the same for fruits. Nuts in their sheaths are termed "coquerelles" (little shells) in blazoning. Flowers are designated by the number of their leaves, trefoil, quatrefoil, cinqfoil. All sorts of flowers are used in arms; yet one rarely finds before the 15 th century the rose, poppy, trefoil, quatrefoil, cinquefoil and fleur-de-lis. [1] In designating the sp species and number of flowers or fruits on a shield, one should also indicate if they are accompanied by leaves, when one says then leaved; if the hang on a branch, they are called s supported. The fruits most frequently found in old arms are apples, pineapples, grapes, acorns, nuts in shells. The quatrefoil and cinquefoil are pierced by a round hole at the middle, that allows the field of the shield to be seen. The rose is said to be buttoned, when its heart is not the same tinct-

i.e., their form and posture are subject to fixed rules. The lion is always represented in profile; he is rampant, i.e., raised on his hind paws, the right fore paw raised, and the left hind paw is behind; or passant, otherwise termed leoparded, if he seems to be walking. The leopard always shows his face, and his habitual posture is passant; if he is rampant, he is called lioned or rampant.

The lion and the leopard have accessory terms common to them; they are armed, langued, accole, membered, crowned, backed, af- affronted, counterpassing, issuant, morne, turned, burelle, cut, party, fesse, checkered, emine, fur. The lion armed is said of the claws, that may be of a different tincture from the body; langued, with the tongue; morne, when he has neither tongue, teech nor claws; deformed if he has no tail. Oliver de Clisson, constable of France under Charles VI bore; gules with lion of argent armed, langued and crowned with or.

During the 13 th, 14 th and 15 th centuries, heraldic animals were represented according to certain conventional forms, which it is necessary to know well, for they were not adopted without reason; the different figures that cover the shield being destined most frequently to be seen from afar, it was necessary for their forms to be strongly accented. The artists of these epochs understood this; if the members of animals a are not well separated, their movement not exaggerated, their appearance not perfectly distinct, at a certain distance these figures lose their special character, and no longer present more than a confused blur. From the 16 th century ornamental drawing has become softer and heraldic figures have lost that character, which made them easily recognized. Men have desired to give animals a more real appearance, and as heraldic art is purely conventional, this attempt was contrary to its principle. It is then of great importance to become intimateln acquainted with the traditional forms given to animals as to all other figures, uhen it is necessary to paint arms. Although in this summary we cannot give very numerous examples, we shall try to collect certain types, that will illustrate how far m men have wandered in the last centuries from forms, that were not attempted without reason, and how useful it is to know them; for in all the arms painted since the Renaissance; these types have daily been more disfigured, at most in the last works t

is said of perforated charges through which is seen the field of the shield.

Crosses take particular forms; one speaks of pattee crosses; d'Argentre (93) bears argent with pattee cross of azure; -- recercele; X (94) bears argent with recercele cross of sable; -- recroisette; X (95) bears argent with recroisette of sable; anchor, X (95′) bears party of gules and argent with anchor cross on both; fichee, X (95″) bears argent with three fichee crosses of sable, 2 and 1; Bastonnee or clavelee, X (95‴) bears azure with one batoned cross of or and argent, or with four batons, two of or and two of argent; -- of Lorraine, X (95[4]) bears azure with Lorraine cross of argent; trefoiled, X (95[5]) bears argent with trefoil cross of gules; -- gringole, i.e., with arms terminating in heads of snakes or wyverns, X (95[6]) bears silver with cross of gules gringolee with sable; -- anilee or nellee, i.e., with nellee cross of sable. The ecotee cross, i.e., composed of two branches of a tree with twigs cut off, wavy, fretty, furry, etc., finally charged with figures that charge the honorable pieces.

The natural forms employed in blazoning may be divided in five classes: -- 1, human figures; 2, animals; 3, plants; 4, stars and meteors; 5, the elements, i.e., water, fire, earth. However figures are either in the ordinary tincture of the blazon or painted in flesh color, with or without clothing, in natural colors and shaded. It is stated whether these figures are clothed and how, crowned, with long hair, shaded, etc.; their attitude and gesture are indicated, what they bear and how.

The most common animals among quadrupeds; the lion, leopard, wolf, bull, stag, ram, boar, bear, horse, squirrel, dog, cat, hare, etc.; among birds; the eagle, eaglets, raven, martlet, swan, eaglet without beak or feet, duck, etc.; among reptiles; the serpent, crocodile, tortoise, lizard; among insects; flies, bees, gadflies; among fanciful or allegorical animals; the siren, dragon, winged serpent, griffin, salamander, unicorn, etc. Animals represented on the arms generally look toward the right side of the shield, if they look to the left, they are said to be turned.

Lions and leopards are the animals most commonly employed, and above all others they have the privilege of being heraldic,

twisted cables; cantonal when in the four cantons remaining between the arms of the cross, charges are set on the field; charged is said of all sorts of charges on which others are superposed; thus the chief, fess, paly, band, chevrons, cross, lions, borders, etc., may be charged with bezants, crescents, roses, etc.; X bears or with three fesses in gules, each charged with five saltiers of argent; chevroned is said of a paly or any other piece charged with chevron, and the entire shield if it is filled; cleches, Toulouse (82) bears gules with cross cleche, opened and with balls of or; -- compony, X (83) bears azure with compony band of gold and gules in five charges;-- cousue is said of the chief, when of metal on metal or color on color, like the arms of the city of Paris (this word is a also used for fasces, bands, chevrons, of color on color or metal on metal); cramponne, the bishop of Hamin in Germany (84) bears azure with potence cramponne at the left, cloisonnee and potenced at the right of or; -- toothed, X (85) bears gules with toothed border of or; Cosse de Brissac (86) bears sable with three toothed fesses of or; when the teeth point to the top of the shield, this is stated; diapered, X (87) bears azure with fess of or diapered with gules; -- checkered, X (88) bears azure with franc quarter checkered with argent and gules;-- engrailed, i.e., having very small teeth, X (89) bears azure with engrailed cross of argent; entes, Rochechouart (90) bears fessy, ente, wavy, of argent and gules; -- interlaced is said of three cross bars, rings or other similar figures, set one within the others; -- faillis is said of broken chevrons; d'Oppede)91) bears azure with two broken chevrons of silver, the first at dexter, second at sinister; floriated, of a cross with arms ending in fleurs-de-lis; -- gringole is said of charges like crosses, saltiers, etc., terminated by serpents' heads; hausse, when charges like fesses, chevrons, etc., occupy a higher place on the shield than that habitually assigned them; -- movemente, of charges that seem to issue from the chief, corners, sides or point of the shield; wavy is said of charges, palys, fesses, chevrons or borders, etc., cut out in waves; -- resarcele, borders of a line and another color. retreats, said of bands, palys and fesses, that on one of their sides do not touch the border of the shield; -- vivree, X (92) bears or with vivree band of azure; vivree

9. Rusts or rustres, that differ from macles only in that the holes are round; X (67) bears gules with three rustes of argent, 2 and 1.

10. Bezants or cakes; the former are always of metal, the latter in color; X bears (68) azure with six bezants of argent, 3, 2 and 1. The bezants may be placed to the number of eight and no more.

The bezants - cakes, which are partly of metal and of color; X (69) bears gules party with or with the bezant-cakes of both.

11. Billets (70), which are little parallelograms set vertically. The billets may be overturned, i.e., set on their sides, but this is mentioned. They are sometimes pierced by squares or rounds, which is also stated.

All honorable charges of the first order have various attributes, or suffer certain modifications, as named here.

They may be abased; des Ursins (71) bears, banded with argent and gules of six charges, chief of or, charged with wavy eel of azure, abased under another chief of argent, charged with a rose of gules;-- accompanied or enclosed, i.e., when around a principal charge, like a cross, band, saltier, etc., there are several other charges in the cantons; X bears (72) sable with cross of argent, accompanied by four billets of t the same; -- a dexter, placed at the dexter side of the shield; X bears (73), sinople with three trefoils of argent a dexter, a cross of or; -- pointed; X (74) bears or with three palys of azure sharpened; -- alesee; Xintrailles (75) bears argent with alessee cross of gules; -- Banded (Fig. 71); barred is said in the same sense as barry; bastille is said of a chief,-- fess, or band crenelated toward the point of the shield; X ((76) bears, azure with chief or argent, bastille with or of three charges; -- banded; X (77) bears azure with band of or, bordered with gules; -- bourdonne is commonly said of a cross with buttons like those of pilgrims; battlemented; X (78) bears or with fess of red, battlements of two and two half pairs; doubly battlemented; X (79) bears red with band with double battlements buttressed of or; -- counter-battlemented; X (80) bears argent with fess battlemented and counter-battlemented of black; -- terrail (81) bears azure with chief of argent, charged with a lion issuant in gules, with cotice of or brochant over all; -- cabled is said of a cross made of cords or

and bars, when very narrow and placed in pairs are called twins or gemelles (54). If arranged in threes, they are called tierces or tierches (55). Fesses of three charges stopped are called hamade or hamaide (56).

When the shield is covered by palys, fesses, bands, chevrons, etc., in equal number, i.e., so one cannot say that such a t tincture is the field, it is blazoned thus:-- palyed, fessed, banded, coticed, chevroned, etc., by so many charges and such tinctures. D'Amboise bears palyed with gold and red of six c charges. (57).

If the number of palys exceeds eight, it is termed vergetted. If the number of fesses exceeds eight, it is called burelled with so many charges; if the banded exceeds nine, it is called coticed.

If the palys, fesses, bands, chevrons are opposed, i.e., if these charges are divided by a line and displaced in such a manner that metal is opposed to color, and vice versa, one t then says counter-palyed, counter-fessed, counter-banded, co counter-chevroned.

The less honorable charges of the second order are:--

1. The emmanche. It is necessary to state whether the emmanche be paly, band or fess. X (58) bears emmanche in fess with one point and two halves of gules on argent.

2. Interchanged points, which are always nine in number, in chequy. Bussy (59) bears five points of or interchanged with four points of azure.

3. Chess-board (60), ordinarily of five lines; when it has less, this must be specified in blazoning.

4. Fretty (61), composed of bands and bars interlacing in number six.

5. Trellisy (62), which only differs from the fretty because the bands and bars are nailed at their crossing; the tincture of the nails is stated.

6. Lozenges (63) and lozengy (64) when the shield is covered by lozenges; de Craon bears lozengy of or and gules.

7. Fusees or fuseey, that differs from lezenges or lozengy only because the figures are more elongated; X (65) bears silver, fusees of sable placed paly with chief of the same.

8. Macles, which are lozenges with smaller lozenge openings; Rohan (66) bears gules with nine macles of or.

mentioning the divisions; if more than four are found, the n number of lines dividing it are noted, and one says; party, so many, crossed by so many, which gives so many quarters. F For example (29), say:-- party by one, crossed by two, which gives six quarters; in the first --, in the second --, in the third, etc. (30). Party by three, crossed by one, which gives eight quarters; in the first --, in the second --, etc. (31). Party by two, crossed by three, giving twelve quarters, in t the first --, in the second --, etc. Each quarter is blazoned in detail, commencing with those in chief and proceeding from right to left of the shield.

The figures or ordinaries of the blazon are of three sorts; 1, the heraldic or proper figures; 2, the natural figures; 3, the artificial figures. Heraldic figures are subdivided into honorable charges of the first or second order. Honorable charges of the first order customarily occupy in width, when a alone, one-third of the shield; excepting franc-quartier, canton and gyronny, which only occupy the fourth part.

These charges are :-- the chief (32), fess (33), field (34), paly (35), band (36), bar (37), cross (38), saltier (39), chevron (40), franc-quarter (41), canton (42), dexter or sinister, pile or point (43), gyron (44), pall (45), border (46), orle (47), narrower than the border, tressure (48) or essonier, th that only differs from the orle by being narrower and floriated, shield in abyss (49), gusset (50), rarely used. When the charges first mentioned are multiplied, they are called repeats. Harcourt bears gules with two fesses of or (51). Arragon (kingdom) bears gold with four palys of gules (52). Richelieu bears silver with three chevrons of gules (53). The honorable charges when not numerous, as we have stated, must fill one third of the shield; but it sometimes occurs that they have less width, the third of their usual width or one-ninth of t the height or width of the shield, when they change names. T The chief is only the diminished chief or top, the diminished paly is termed vergette, the diminished fess is the devise; the diminished band is the cotice; the diminished bar is the traverse. The cotice and traverse are clipped, when they do not touch the edegs of the shield. In this case the cotice is called a baton ending as band, and the traverse a baton ending as bar. The diminished field is called plain. Fesses, bands

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embrasse from right to left (23); X bears white embrasse at left with gold; X bears white embrasse at right with red; vetu (24); X bears gold vetu by blue; adextre (25); X bears white adextre by blue; senestre (26); X bears azure senestre with silver.

The position of figures placed on the shield must be accurately determined, and to do this, it is necessary to know the different parts of the shield (27). A is the centre of the s shield; B the chief; D the dexter canton of the chief; E the sinister canton of the chief; F the dexter flank; G the sinister flank; C the point; H the dexter canton of the point; I the canton sinister. When a single figure alone occupies the centre of the shield, its location is not specified. If two, three or more figures are arranged in the sense of the letters D B E, they are said to be arranged in chief; if like the letters F A G, in fess; if they follow the order of the letters H C I, in point; placed like B A C, they are in paly; like D A I, in band; like E A H, in bar. Three figures are generally placed like the letters D E C, two and one; when placed as t the letters H I B, they are termed badly ordered. Figures placed like D E H I are designated two and two. Five figures set as B A C F G are in cross; as D E A H I, in saltier; like D E A C, in paly. Pieces ranged as D B E G I C H F, in orle. A f figure placed at A in the middle of several others different in form is in abyss. When a shield is not charged with any f figure, it is said; X bears such a metal or such a color. The old counts of Gournay bore plain black. If the shield is only charged with a fur, it is said; X bears ermine (Fig. 1). If it is charged with figures, it is necessary to examine if it is simple, i.e., without partitions, or if it is compound.

If it is simple, one first mentions the field, then the principal figures, and those accessory or only secondary, then their number, their position and their tinctures; the chief a and the border are designated in the last place as well as t their figures.

When the principal charge encroaches on the chief or the b border must then be named before the principal charge.

Vendome anciently (28) bore, argent with chief of gules, a lion of azure, hampant, tongued, crowned with gold, extending over the whole. If the shield be compound, one commences by

Sometimes ermine and vair adopt colors other than those pr-oper for them; one then says ermined or vaired of a certain tincture; for examplet-- Beaufremont bears vaired of or and gules. (5). A general rule of blazon is to never place color on color, with exception of purple, nor metal on metal; otherwise the arms would be false, or at least to be investigated. By arms to be investigated are designated those, that do not obey the common rule, that are given for some remarkable act; in that case color may be placed on color or metal on metal. The intention of this is, that whoever assumes such arms must give an account of the motive, that caused him to adopt them.

The shield or field is simple or compound; in the first case it has a single tincture without divisions, and in the second it may have several tinctures. It is then divided or party. There are four principla divisions, from which are derived all others:-- party, that divedes the shield vertically in two e equal parts (6); coupe (7); tranche (8); taille (9). The party and coupe form ecartele (10), that is of 4, 6, 8, 10 or 16 quarters, or sometimes even more. The tranche and taille give the ecartele en sautoir (11). The four divisions together give the gyronny. (12). When the gyronny is of 8 pieces like the ax.mple (Fig. 12), it is simply termed gyronny; but when there more or less parts, the number is stated; gyronny of 6, 10, 12 or 40 pieces. Tierce is said of the shield divided in three equal parts of different tinctures, according to each of the divisions. Thus tierce by party is called tierce per paly (13); X bears tierce per paly, black, white and blue; tierce per coupe is termed tierce per fess (14); X bears tierce per fess of blue, gold and red; tierce per band is given by the tranche (15); X bears tierce per band of gold, red and blue. There are further tierces that do not relate to the four first divisions, but which are traced according to certain heraldic figures. There is tierce per chevron (17); X bears tierce per chevron of white, red and black; tierce per point or mantle (18) X bears tierce per point or per mantle of blue, white a and red; tierce per ecusson (19); X bears tierce per ecusson of red, white and blue; tierce per pairle (20); X bears tierce per pairle of white, black and red; the chappe (21); X bears red with three palys of white chappe with gold; chaussee (22); X bears red or paly of silver chaussee with gold; ambrasse f

borrow the summary that we give here.

Note 1. p. 471. To blazon comes from the German word blasen, to blow(sound the horn); "It was formerly the custom of those who presented themselves to enter the lists at tournaments, thus to notify their arrival; then the heralds sounded a trumpet, blazoning the arms of the knights, describing them with a loud voice, and sometimes entered into elogies in regard to these warriors." (Nouv. Meth. du blason, or l'Art herald. of P. Menestrier, placed in a better order, etc. by M. L. Lyons. 1770.

Note 2. p. 471. Louis the Young is the first of our kings to be represented with fleurs-de-lis in his hand and on his crown. When he caused his son to be crowned, he desired the dalmatic and the boots of the young prince to be of azure color and spotted with fleurs-de-lis of gold. (The same).

Three things must enter into the composition of arms; tinctures, field and figures. The tinctures comprise:-- 1, metals, which are or (gold) or yellow; argent (silver) or white; 2, the colors, which are gules (red), azure (blue), sinople (green), pourpre, that is a violet approaching red, sable, that is black; 3, the furs, that are ermine and vair, to which may be added counter-ermine and counter-vair. The colors proper for ermine are silver or white for the ground, and black for the spots (1); the contrary for counter-ermine, i.e., black for the ground and silver or white for the spots. [1] Vair is always of argent and azure, and is expressed by lines indicated here. (2). Counter-vair is also of argent and azure; it differs from vair because in the latter the metal is opposed by color, while in counter-vair metal is opposed to metal and color to color. (3). Vair en pal or pointed is formed by opposing the point of one vair to the base of the other. (4).

Note 1. p. 472. It is understood that according to the method employed since the 17 th century to represent by engraving the tinctures of arms, we express argent by the absence of all hatching, or (gold) by a dotted surface, azure (blue by horizontalhatching, gules (red) by vertical hatching, Sinople (g (green) by doagonal hatchin from right to left (of the shield), purple by diagonal hatching from left to right, sable by black, although in etching or intaglio it is represented by crossed horizontal and vertical hatching.

children, and these were accustomed to regard those shields of arms as property of the family, a mark of honor and of g glory, that must be preserved and transmitted from generation to generation. Thus the arms, first assumed so as to be recognized during the combat, became hereditary like the name and property of the chief of the family. Who does not recollect seeing, after the wars of the revolution and of the empire, a rusty old musket hung over the mantle of the fireplace of each cottage?

Arms having become hereditary, it was necessary to subject them to certain fixed laws, since they became the titles of the family. It was necessary to blazon the arms, i.e., to explain them. [1] But it was only toward the end of the 12 th century that the heraldic art fixed its first rules; [2] during t the 13 th century it was developed and became settled during the 14 th and 15 th centuries. Then the science of heraldry was much honored; it was like a language reserved for the nobility, of which they were jealous, and that they desired to maintain in its purity. Arms during the 14 th century had taken a great place in the decoration, fabrics and clothes; then the nobles and the men of their house wore costumes decorated by arms. Froissart in his Chronicle does not name a noble of any importance without following his name by a description of his arms. The romances of the 13 th and 14 th centuries, descriptions of festivals, or of ceremonies, are filled with heraldic mentions. In this Article, we can only give a summary v view of this science, although it may be of great utility to architects, who occupy themselves with archaeology. For lack of knowing its primary elements, we have seen in our time mistakes committed, whose least iuconvenience is to expose one to ridicule. It is a language from which one must abstain using, if he does not know it well. Louvan Geliot in his Indice armorial (1635) justly says; "That the knowledge of the various kinds of arms, and of the parts of which they are composed, is so abstruse, the terms are so seldom used in other subjects in writing or in speaking, that several years are required to sound the depth of that abyss, and long experience to penetrate to the heart and centre of that chaos." Since that author, P. Menestrier in particular has rendered more easy t the study of that science; it is especially from him that we

common in our churches and everywhere destroyed, first by chapters, monks or curates of the last century, then by the revolution.

In private houses, in the halls and towers of castles, were frequently found closets constructed in the thickness of the wall. We reproduce (4) the illustration of one still existing in the great square tower of Montbard, whose construction dates from the 13 th century. These closets were intended to p preserve provisions; sometimes they are ventilated and divided by slabs of stone or of wood. One notices with what care t the constructors have left projections on the stone at the p points where the hinges are fastened or the bolt is fixed. (Arts. Gache, Gond, Verrou).

ARMOIRIE. Heraldry. Shields of Arms.

When the westery armies threw themselves on the East for t the conquest of the Holy Sepulchre, their combination formed such a mixture of peoples differing in customs and language, that it was necessary to adopt certain signs to make one recognized by his own people, when he came to combat the enemy. Kings, constables, captains and even simple knights with the same men under their lead, so as to be distinguished in the fight in the midst of allies or of enemies, whose costumes were nearly uniform, caused to be painted on their shields m marks in strong colors, so as to be seen afar. Thus the oldest arms are the simplest. From the 11 th century the custom of tournaments was already introduced in Germany, and the combatants adopted the colors and emblems, that they bore during the jousts; yet at that epoch the noble warrious appear to ha have changed devices or marks and colors at each tournament. But when the shields of arms were shown before the infidels, when after returning from the fields of battle in the East, western Christians brought with them these painted arms, they must retain them for a souvenir and honorable evidence of their high deeds. For all true men, that have risked dangers, have loved to preserve the evidence of their long sufferings, their efforts and their success. Arms painted in varied colors, strong figures, bearing traces of combats, were religiously suspended on the walls of feudal castles; before them the old nobles related their adventures beyond the sea to their

says he, [3] "that men had of preserving the very holy sacrament in ambrys built in the wall beside the altar, is already lost everywhere in this diocese, because that they were ornamented outside by images and paintings in gold and blue, according to the ancient custom no longer approved by the holy Church. These are wisely removed for several reasons. [4]

Note 1. p. 467. Armariolum, a tabernacle in which the body of Christ is preserved. Statutes of the church of Leodiensis in 1287, in Martinium. Vol. 4. Anecd. col. 841.(Latin text).

Note 2. p. 467. Rubric 16. (Latin text).

Note 3. p. 467. French translation of his Notice to rectors, curates, priests and vicars. Bordeaux. 1613; Lyons, 1644.

Note 4. p. 467. Traite de l(exposition du saint sacrement, by J. B. Thiers. D. in Theol. Vol. 1. p. 38, 39. Avignon. 1777.

We give here (1) an ambry of this kind arranged in the arcade of the base of the chapels of the choir of the abbey church of Vezelay. (Beginning of 13 th century). The doors of t these ambrys, now removed, were ornamented by gilded ironwork and paintings.

Here (2) is an ambry copied from one of the reliefs on the base of the portal of the cathedral of Rheims, that will give an idea of these fixtures placed beside altars.

The precious relics of the S. Chapelle of the Palace at Paris were enclosed in an ambry set on an open credence, and t that credence itself was placed on the vault of the shrine er erected behind the high altar. This ambry was called the great reliquary. "It is," says Jerome Morand, "a great arch of gilded bronze ornamented by some figures on the front; it is elevated on a gothic vault placed behind the high altar in the apse of the church, and it is closed by ten keys of different locks, six of which fasten the two external doors, and the four others an inner lattice in two leaves." [1] (Art. Chasse).

Note 1. p. 468. Hist. de la S. Chapelle du Palais, by S. J Jerome Morand. Paris. 1790.

There still exists in the old abbey church of Souvigny a g great stone ambry of the beginning of the 15 th century, that is very rich and served to contain relics; it is placed in t the transept of the south side. The doors are of wood and are decorated by paintings; we give it here (3), for it is one of the rare examples of these permanent articles formerly so com-

lose their importance. Yet they were still retained iu monuments to be decorated with care, between the tracery, the framework forming compartments varied as may be seen at the S. Chapelle. But in the 14 th century men ceased to set carved bars between the tracery, and returned to transverse and vertical bars. Then were given greater dimensions to the legendary subjects of the glass, and the iron framework could not take the form, that would have restricted the glass painters in their compositions. (Art. Vitrail).

ARMOIRE. Ambry. Cupboard.

This is a recess arranged in a wall, closed and destined to receive articles having some value; or a piece of furniture in joinery closed by doors, placed in edifices or apartments in a permanent manner. We occupy ourselves here only with fixed cupboards, intended to be immovable, according to modern language, portable articles being outside our supject.

In the most ancient abbeys, beside the cloister was arranged a closet or a simple recess in the wall called an armarium or armariolas, in which the religious placed during the day's work in the fields the books, that they used daily. Beside al altars an ambry was formerly reserved, either to preserve the holy sacrament under a lock, or to enclose the articles necessary to the service of the mass, or the treasures. [1] Dom Doublet in his Antiquities of the Abbey of S. Denis, says that near the altar of the holy martyrs, "there are several precious and sacred things. First at the right side in an ambry is kept one of the precious nails, etc. At the left side of the altar in a great ambry is the sacred head of S. Denis the Areopagite, apostle of France, etc." In the Treatise on the Exposition of the holy sacrament by J. B. Thiers may be read t this passage:-- "Before tabernacles had become so common as they appear among us, in most churches the eucharist was kept in the ambrys beside the altars, in the piers, or behind the altars. There are still found today a number of these ambrys, indeed used as places for keeping the holy oils, as ordained by the provincial council of Aquilegia in 1596. [2] J. Baptiste of Constance, archbishop of Cozence in Calabria, who lived at about the end of the last century (18 th), shows that in his time, there were none in his archdoicese:-- "The custom," sa-

to giving them a considerable width and height; then being compelled to divide their openings by iron rods, the panels of glass assembled in leads not being able to exceed an area of 2.0 to 2.6 sq. ft. without risk of fracture. (Art. Fenetre, Vitrail). The ironwork was at first simple, i.e., only composed of vertical and transverse rods (2), but soon assumed forms more or less complicated, according to the design of the legendray panels of glass, and it was divided into a series of circles, quatrefoils, squares set diagonally, parts of intersecting circles, etc. We give here (3, 4, 5) various examples of these kinds of ironwork. [1] One of the most singular specimens of these iron enclosures is seen in the little church of Notre Dame of Dijon. This church belongs to the first half of the 13 th century; the two gables of the crossing admit light through two great rose windows without stone tracery. Ironwork alone supports the glass. Here (6) is the complete drawing of these frameworks, that afford a fine field for the stained glass, and whose compartments are skilfully arranged with good effect and great strength.

Note 1. Fig. 3 is the ironwork of the great central window of the western facade of the cathedral of Chartres (of the 12 th century).

Fig. 4 is from a window of the nave of the cathedral of Chartres.(1210 to 1230).

Fig. 5 is from a window in the chapel of the Virgin in the cathedral of Mons. (1220 to 1230).

The assemblage of these pieces of iron is always very simple, so as to be easily set,removed or repaired, all parts being connected by tenons and mortises, without rivets or pins; as for screws, their use was not then known in locksmith's work. The detail given here (7) will illustrate the system of setting these frameworks. These rods were forged by hand and without the aid of rolls, and quite unequal in thickness; they a average 1.2 ins. wide by 0.8 in. thick. As in all frameworks the glass panels are held by means of projections and keys a arranged as indicated by the detail (8). The enlargements receiving the tenons are outside and the projections inside, w while the bars are all flush to receive the glass panels.

When about the middle of the 13 th century the great windows were divided by stone mullions, the iron frameworks must

are built without a single bit of iron; ties, frames, pendants, supporting frameworks are only in wood, without a bolt or strap. If the art of the smith was called to lend its aid to masonry, it was absolutely excluded from carpentry, and it only appeared to associate itself with ornamental leadwork. (Art. Plomberie). It is certain that the numerous disasters that i immediately followed the construction of the great vaulted m monuments in the North (Art. Architecture Religieuse) inspired the architects of the 12 th and 13 th centuries with such mistrust, that they did not believe it possible to do without i iron in the combinations of masonry designed to resist the t thrust of high vaults; this explains the great quantity of iron chains and cramps found in the masonry of those epochs. Only the lack of sufficient resources forced architects to not lavish iron in their structures; but when reasons of economy did not restrain them, they did not spare it. Thus one has been surprised by seeing that the arches of the apsidal vault of S. Chapelle are each supported by two curved flat strips of iron set to project along their surfaces.(1). These iron bands are about 2 ins. wide by 5/8 in. thick, and are connected together by great rivets or bolts passing through the heads of the voussoirs. They evidently date from the epoch of the construction, for they could not have been set later; they join at the crown by means of a V also of iron and riveted with th them, thus rendering them entirely stable at the crown of the vault. This excess of strength was superfluous, and these arches had no need of this assistance; it is the sole example of ironwork of this kind known to us, and yet there exist a great nugber of vaults lighter than those of S. Chapelle of the Palace, that although not provided with this, have perfectly retained the purity of their curvature.

Forged ironwork had made a great advance after the end of the 12 th century. One can be convinced of this by seeing with what skill are treated the hinges, that were to hand the doors in that epoch; that custom of working iron, making it obey the hand of the forger, must have induced architects to employ i iron for supporting the glass panels intended to fill the great windows, that men commenced then to open in important edifices, such as churches. At the end of the century windows were not yet divided by stone mullions, and still men adhered

reposed the holy martyrs." [1]

Note 1. p. 461. Hist. de l'abb. fe S. Denys en Fr.nce, by F. J Doublet, a monk of the said abbey. Book 4.p.1197.

In imitation of certain works of the later empire during t the Romanesque period, parts of silver were frequently inlaid in the bronzes, that covered the doors of churches, rood screens and tombs; figures often had their eyes or the embroideries of their vestments in chiseled silver. In the works of g great monumental silver work, gilded silver (silver-gilt) played a great part. (Arts. Autel, Chasse, Tombeau).

Afteh the 13 th century the interiors of edifices were often decorated by plates of colored glass, under which were placed sheets of silver leaf to give them more brilliancy. (Art. Application).

ARMATURE. Iron supporting frame.

By this word is designated every combination of iron or wood intended to strengthen or support a work of masonry or carpentry; also for iron frames in which are set panels of glass. During the Romanesque period iron was little employed in structures; men could only forge small pieces, mechanical means being defective. To resist the thrust of vaults, to connect walls, pieces of wood were inserted in the thickness of the masonry, held together by iron pins; but these were ties (Art. Chainage) rather than frames properly so called. When because of the adoption of the pointed arched system of construction, architecture bacame both lighter and more complicated, when edifices must take a great extent, iron was called on to play a very important part in the art of building, and already from the end of the 12 th century in the North of France, it w was thought necessary to employ it in great quantity to connect and give strength to masonry. The use of this material, whose injurious effects were then little known, frequently h hastened the ruin of monuments instead of preventing it. (Arts. chainage, Crampon). For framework iron was employed only very late, and during the entire pointed period it was not used. (Art. charpente). Mediaeval carpenters until the end of the 16 th century sought no combinations other than those afforded by a judicious use of wood without the aid or iron-work. All the great old works in carpentry, including therein spires,

connects its lower part with the ends of tie-beams, at its top with the king post, and to which are fastened the jack rafters. (Art. Charpente). Plumbers also term hip the strip of lead h held by tacks and sometimes decorated by a torus, crockets or projecting ornaments, serving to cover the angles of a roof of a pavilion or spire. (Arts. Plomberie, Fleche). Formerly and in some parts of the North, carpenters and roofers still say "eustier." (Art. Aretier.

ARETIER. Hip Tiles.

Tiles shaped to fit and cover the angle of coverings of terra cotta at the hip. For coverings of hollow tiles, these hip tiles are only larger and more open at their wider or lower part than ordinary tiles; but for coverings of flat tiles the hip tiles have projections inside to prevent them from slipping on the others. We have seen old hip tiles so made in Burgundy and in Champagne. The custom was in monuments of very ancient date to ornament the back of the hip tile by a simple button intended to prevent the slipping of these cover tiles. The manuscripts of the 12 th, 13 th and 14 th centuries frequently represent hips of roofs covered by tiles and decorated by crockets; in Champagne and Alsace still exist on some edifices rare examples of these decorated hip tiles.(Art. Tuile).

ARGENT. Silver. White.

This metal was rarely employed in the decoration of edifices in the middle ages. The rapidity with which it passes into the state of oxede or of sulphuret of silver has caused its exclusion, since from a brilliant white it becomes an iridescent black. Yet the monk Theophilus wrote in the 12 th century his Essay on various Arts, and speaks of silver laid on walls or ceilings; he also gives the means of cleaning plates of gold or silver fixed by means of nails. Indeed from the first centuries of the middle ages men frequently overlaid altars, shrines, tombs of wood or stone with plates of natural or gilded silver. Dom Boublet states in his work on the Antiquities of abbey of S. Denis, that king Dagobert caused the church of t that monastery to be covered with lead everywhere, except on a certain part of the roof as of the interior of the said church, that he had covered with silver, i.e., the place where

on the braces and posts of a house at Abbeville (10); on the posts and sills of some houses of Rouen and of Lizieux (11); at the apex of the gable of a house No.75 of the main street at Rouen (12). Sometimes also to ornament the coatings of mortar or plaster between the members of the framevork of private houses, some cut slates forming an ornament were nailed on. (13). At the chateau of Chambord the pavilion crowning the g grand stairway exhibits round medallions or lozenges by slate forming at a distance black points, that accent and relieve these summits. We have sometimes seen in these edifices of t the end of the 15 th and beginning of the 16 th centuries bits of slate inserted in the very small open arches of pinnacles, supports, plinths and tombs, and that by their obscure tone accent the openings of the stone. The stone setters of those epochs also used slates to wedge up stones, and one frequently finds them in the joints. The two very delicate columns that support the turret of mansion de la Tremoille at Paris, whose remains are deposited at the Ecole des Beaux Arts, were wedged with slates covering the surfaces of their beds.

Note 1. p. 457. See Essai sur girouettes, epis, cretes, etc. By E. De La Queriere, 1846, in which is found a sufficiently great number of examples of these slate facinge.

Note 1. p. 458. Houses located at No. 88 Grand Rue, corner of Rue du Tambour, Rue de Bac 66, Rue du Ruissel, at Rouen.

We have seen in countries where schist is common, slates employed in great pieces, either to serve as railings of stairways, as purlins in roofs to support rafters, as posts of sheds, as enclosures of gardens in great slabs set in the ground, or again as tombstones, particularly during the 15 th and 16 th centuries. The custom of painting slates cannot be doubted, although we have been unable to find painted or gilded slates before the 16 th century; but in the houses of the 15 th century are sometimes found Slate shields fastened on wooden framework, and it is to be presumed, that they were intended to receive the colors and arms of the owners.

ARETE. Edge or angle. (Arts. Voute, Charpente, Taille).

ARETIER. Hip of Roof. Hip Rafter.

A carpentry member forming the inclined angle of a roof, c

wind from passing under the roof. Further, tiles do not lend themselves to complicated coverings, such as an advanced state of civilization is obliged to employ, either to construct dormers, for chimney caps, average crestings, valleys, hips and intersections. The nearly general use of slate, at least for edifices of some importance, had an influence on the forms of roofs; until about the end of the 12 th century was rarely u used an inclination of more than 45°, which is the steepest slope for tiles, but it was believed necessary to increase the steepness of roofs intended to be covered by slates, as these were each held by two nails, they could not slip like the tiles with a roof too steep, and the nearer their inclination approached the vertical, the less hold they offered to the wind. The steepness of roofs covered wit slates also had the advantage of allowing the snow to slide off, that thus c could not remain on their slope.

Note 1. p. 4.6. Guage is called that part of slates or tiles remaining visible when laid by the roofer on battens or laths. The guage being a third or a quarter of the length of the slate, each part of the covering is covered by three or four thicknesses of slate, and each slate exposes only one third or one fourth of its length.

In the cities of the North after the 14 th century, many h houses were constructed of half timber work, and men then as now took care to cover the panels by plaster. However to not allow the wood to be directly exposed to storms, it was either carefully painted, or when exposed to wind and rain, it was covered by slates or by wooden tiles.(Art. Bardeau). Sometimes this facing covered the members of the framework and t the panels; frequently the panels remained visible as a simple coating of plaster or bricks, and the slates covered only the posts, braces, rails, struts and curved pieces of the framework. In the 15 th century these slates serving as a vertical facing of the framework were frequently cut to form designs of various kinds; this custom continued during the 16 th century. [1] Houses of Rouen, Abbeville, Caudebec, Lizieux, Troyes and Rheims, that date from the 15 th and 16 th centuries, still present traces of these cut slate facings on wooden framework. Here (9) is the arrangement of the slates enclosing the angle posts of several houses of Rouen; [1] which are found

it serve for the decoration at the same time as the covering of edifices. They had noticed that slate had different tints according to which direction its surface was presented to the sunshine; they utilized without cost this property of slate to compose the roofs of mosaics in two tones.(4). Also they frequently cut their slates in various ways, (5), or they set t them in a fashion to break the monotony of the coverings, either quincunx (6) or with points (7), either as practised on the banks of the Moselle, and particularly at Metz and Taurus, in ordinary scales or in bias scales, called German roofing. These different methods adopted after the 13 th century suffered notable changes during the course of the 14 th and 15 th centuries. Slates were better quarried, more regularly supplied, better and thinner, and if the appearance of the coverings w was improved, it was just the same for their durability. The old slates (we now speak of those of the 12 th and 13 th centuries) have a thickness of 3/8 to 5/8 inch, while those of the 15 th century rarely have 5/16 inch at most. As for their length and breadth, generally the old slates employed in the West and North are small, about 7 ins. wide by 10 ins. long; they often belong to the series now called heridelle, only 4 ins. wide by 15 ins. Yet the old roofers took care to commence their coverings by setting on the edge of the sheathing of t the roof a row of wide and strong slates to give less opportunity for the wind. The old slate coverings were very steep, the weathering being only a third of the length of the slates. It may be stated that a covering of thick slates on a steep slope, nailed on battens of chestnut or white oak lasted for centuries without need of repairs, particularly if care were taken to avoid multiplying valleys, hips and wide spaces between rafters, or at least to flash them well with lead firmly attached. After the 13 th century, everywhere that slates could be imported, great preference was given to them over tiles, and this was not without cause. The slate of Angers or of the Ardennes does not absorb an appreciable quantity of water, a and by its natural warmth (?) allows it to rapidly evaporate, after falling on its surface; on the contrary tiles, if not glazed, absorb one-eighth their weight of water, and drying slowly gradually allows the dampness to penetrate the woodwork; even if well laid, they cannot prevent snow driven by

employed except for ordinary structures, and as they are still used in Mt d(Or, Montenegro and in the Ardennes. Only about the end of the 12 th century did slate become in general use in the North or West of France. Palacis, houses of rich citizens and even churches were already covered with slates. The adoption of conical roofs for towers of castles made the use of slates obligatory, for one could not conveniently cover a conical roof with tiles, unless they were expressly made in different widths, while slates could be easily cut, always a allowing the joints of each row on a conical roof to overlap. When these conical coverings were of very small diameter, on stair turrets, for example, to avoid the projecting corners t that flat slates would have shown on a coursed convex surface, their lower ends were cut in the form of scales, and care was taken to keep them very narrow, so that they could better fit the conical surface (1); and since each row with the diminishing diameter must diminish the number of slates composing it, the system of rows of scales was often stopped at regular distances by a square row, and then the scales were resumed in less number, without the eye being shocked by the change made in the regular covering of the joints (2); or again when by a regular covering of several rows of slates on a conical surface, the slates became too narrow to continue, one slate is used to cover two joints (3).

According to the nature of the schist, slates were more or less large or thick. In Montenegro and a part of Auvergne, schists split badly and are full of hard streaks, that prevent cutting them regularly; thus in these countries the coverings are heavier; but in the Ardennes, on the banks of the moselle and in Anjou, very pure schists present great regularity in the cutting of slates, and from the 13 th century men have not failed to profit by the qualities of these materials to make coverings solid, easily set, not expensive and very pleasing in appearance. The color of the slate of Anjou, its metallic appearance and small thickness, combining,perfectly with lead, men continue to employ this metal for covering the timbers, crestings, hips and valleys, dormers, reserving the slates for the large flat portions. But the architects of the 10 th century had a sort of repulsion to ornamentation, which soon led them to seek the means of employing slate by making

epoch of the Renaissance one again finds the architrave employed with the antique orders, and its proportions are then very variable in regard to the diameter of the column. (Art. Entablement). The antique architrave is composed of a single piece extended from one column to another. There is no exception to that rule iu Greek architecture; if the Romans already cut architraves in vouissoirs, this is a false application of the principle of the antique entablature. When one finds architraves in the orders belonging to the architecture of the Renaissance, they are generally formed from a single block of stone, as during the good period of antiquity. Only scarcely toward the last half of the 16 th century did men have the i idea of jointing architraves; and later yet, when the mania for copying the forms of antique architecture possessed architects, without regard to the principles of construction of that architecture, the architrave and frieze were both jointed together by extending the joints of the voussoirs across these two members of the entablature; this was gross nonsense, which is perpetuated to our days.

ARDOISE. Slate. Slating.

(A laminated schist). In countries where schist is easily mined, it has been used in all times, either for flooring interiors of houses, or for covering them, even to enclose fields. The toughness of that material, its strength, the ease with which it can be split into thin sheets, must necessarily induce builders to employ it. This material has also been utilized as rubble. Anjou, some parts of the Pyrenees and of the Ardennes have retained very ancient structures built of schist, that have perfectly resisted the effect of time. But chiefly to cover carpentry have slates been employed. It appears that from the 11 th century in schistous countries, slate has been used concurrently with hollow or flat tiles. In the structures of that epoch we have found numerous fragments of large slates, [1] very thick and badly cut, but no less forming an excellent covering. However, even when one does not find the means of quarrying slate on a great scale, of splitting and regularly cutting it, one must prefer tiles, that when m made with care and glazed in different colors, have a much richer and more monumental appearance. Slates were rarely em-

at the larger places will be 26 paces, at the others 21 paces; R S will be 2 1/2 paces, the slope of the counterscarp, with its height S T being five paces; the covered way T V on the line C V will have a width of 5 to 6 paces, the glacis V X w will be raised 1 1/2 paces above the covered way, and this w will vanish into the ground at 15 or 20 paces; that will be the section, of which three different kinds exist; the pace is understood to be three royad ft."

De Ville recommends false outworks before the rampart as g giving much strength to the place, because being masked by t the section of the covered way, they retard the establishment of breaching batteries, and sweep the ends of the trenches in the moat; he makes them of earth (75) as indicated at A on t the section.

It was then with fortification as with all other branches of the art of architecture; men were passionately fond of rules; each engineer introducing his system; and if we have spoken of chevalier De Ville, this is because his methods are practical, and result from experience. But Vauban recognized, that the bastions erected by engineers preceding him were too small, t their flanks being too short and weak, the half gorges to narrow, the moats badly aligned, and the covered ways too narrow, places of arms too small, and the outworks insufficient. To him and to de Coehorn are due systems of fortification very superior to those preceding them. However, and even by the c confession of these two celebrated men, and in spite of their efforts, the attack will remain superior to the defense.

ARCHITRAVE. Architrave.

This word designates the first member of the antique entablature, is not found in use from the 10 th to the 16 th centuries, since then had been abandoned the lintel resting on columns; then being no longer intended only to support arches. It in some special cases during the middle ages, platbands e extend from one column to another, these should rather be regarded as lintels than architraves, (Art. linteau), for the a architrave in order to retain its name requires the superposition of the frieze and the cornice. Indeed architrave properly signifies the master beam, and in the antique entablature this supports the other members of the entablature. In the

must be made for it, the same will be done at all other angles. Take the angle R H L of the hexagon at which a bastion is to be made. Divide one side H L in three equal parts, and each of these into two, which will be H F and H Q, of the other, a and that will be the half gorge of the bastion; at the points F a and Q draw F E and Q M perpendicular to the sides and equal to the half gorges; from one end of the flank to the other draw E M, prolong the half diagonal S H, and let I A be made equal to I E; after having drawn A E and A M, which makes the bastion Q M A E F a rectangle, and it will take as much of t the defense of the curtain as possible, which will be known if the faces A E and A M are extended to meet this curtain in B and K, the line of defense will be A C."

Note 1. p. 450. Les Fortifications of Chevalier Antoine De Ville. 1640. Chap. 8.

"One will note that this method cannot serve for places with less than six bastions, because the flanks and gorges remaining of proper size, the bastion becomes an acute angle. As f for the other parts, the width of the moat or courterscarp V X, Y Z, will be made parallel to the face of the bastion, with the width distant from it as much as the length of the flank."

De Ville adopts orillons or shoulders at the flanks of the bastions, but he prefers rectangular to circular orillons. HE adds to the plan (74) the section of the fortification. (74 bis).

"Draw at pleasure," adds De Ville, "the line C V, and on it take C D five paces, at the point D erect the perpendicular DF equal to C D and draw C F, which will be the front of the rampart; from the point F draw F G 15 paces parallel to C V, and at the point G erect G H one pace, then draw F H, which will be the section of the rampart with its slope toward the place, H I will be made 4 ft., and G L will be 5 paces for the thickness of the parapet; K L will be drawn vertically, but K must be two paces higher than the line C V; afterward will be drawn K N, the slope of the parapet N Y, the covered way will be about two paces with less than a half pace in thickness with h height M Y of seven or eight feet; afterward M P is drawn perpendicular to C V, so that it may be five paces below O; i.e, below the level of the country, which is the depth of the moat. P Q is the slope of the wall, which should be 1 1/2 paces, and Q will be a little above the glacis; the width of the moat Q R

direction indicated by careful observation at the bottoms of these wells, of the noise produced by mining. Sometimes also countermine galleries were constructed beneath the covered way or the outer slope, but it hardly seems that the last means had been employed in a regular manner before the adoption of the system of modern fortification.

Note 1. p. 449. Della fortif. delle citta by Girol. Maggi and Capt. Jacomo Castriotti, engineer of the Christian king of France. 1583.

Only gradually and after numerous experiments could men arrive at rules in the construction of defensive works. During the course of the 16 th century are found nearly in germ the various systems adopted since, but the general method is defective; the unity of monarchical power could alone lead to d definite results; thus it is interesting to observe how the art of fortification applied to artillery follows step by step the royal predominance over the feudal power. Only at the beginning of the 17 th century, after the religious wars under Henry IV and Louis XIII, are the works of fortification traced according to fixed laws based on long observation; that they abandoned definitely the last remains of ancient traditions to adopt rules established on new calculations. Thenceforth engineers did not cease to seek the solution of this problem; to see the besiegers without being seen, arranging cross and sweeping fires. This exact solution would render a place perfect and impregnable; it is still to be found, we at least b believe. Without entering into long details arising from my subject, we cannot describe the attampts made from the beginning of the 17 th century to lead the art of fortification to the point where Vauban left it. We shall only give the first Fig. of the Treatist of chevalier De Ville, [1] in order to exhibit the new principles upon which modern engineers established their systems. "The hexagon," says that author, "is the primary figure that one can fortify, the bastion remaining a right angle; that is why we shall commence with it, and having given the method for it, it can be applied in the same manner to the other regular figures. (74). First construct a regular figure, i.e., having equal sides and angles, as many sides as you wish the figure to have bastions. In this figure we have placed the half of a hexagon, and having shown how one bastion

presented a covered and an uncovered battery sweeping the moat.

Note 1. p. 447. Topog. de la Gaule. Merlom. Topog. de la F France. Imp. Liby.

The merit of the engineers of the 17 th century, and particularly of Vauban, was to arrange the defenses so as to converge on the first point attacked, and destroyed by the enemy, the fire of a great number of pieces of artillery, to change thus at the moment of assault the conditions of the besieging and besieged armies, to simplify the art of fortification, to throw aside a multitude of works of detail, very ingenious on paper, but which are only destructive at the time of a siege and cost very high. Thus gradually was given a greater area to the bastions, orillons of small diameter were suppressed, that when destroyed by the artillery of the besiegers encumbered with their ruins the batteries intended to sweep the moat at the moment of assault, that the greatest attention was paid to the outlines, as being one of the most powerful means of retarding the works of approach, when a considerable width w was given to the moats before the false outworks, that the stone facings of the parapets were replaced by slopes of earth covered by sod, that the gates were masked in defending them by advanced works and by flanking them, instead of making their strength consist in this special construction.

A new means of rapid destruction of the ramparts was applied at the beginning of the 16 th century; after having mined the base of the facings of the defenses as had been done from time immemmorial, instead of supporting them by struts afterwards set on fire, there were established chambers filled with gunpowder, and thus considerable portions of the terraces and f facings were blown up. This terrible expedient was already p practised in the Italian wars, and besides opening wide breaches to the assailants, had the effect of demoralizing the g garrisons. Yet means were soon found to prevent these labors of the besiegers; in places where the moats were dry, vaulted galleries were constructed behind the facings of the ramparts, that allowed the defenders to oppose placing mine chambers ((73 bis), [1] or at regular distances were sunk permanent wells in the terraces of the bastions, to start from them countermines in time of siege, and when men succeeded in recognizing the direction of the galleries of the hostile miners, a direc-

12 th centuries of placing in the walls or through vaults ducts or traps, a sort of speaking tubes, that allowed the chief of the post to be placed at the point where he could best see the exterior, and to give orders to each story. But when the noise of artillery was added to its material effects, men understood how insufficient were these means of communication; the rule must then cause the adoption of broad arrangements in the construction of fortifications, and oblige the besieging and besieged armies to renounce war in detail.

The method that consisted in fortifying places outside of old walls had inconveniences; the besiegers battered at the same time two defenses, the second over the first; they then destroyed two obstacles, or at least overthrew the first and shot away the second, reduced its parapets to dust, dismounted both the lower and upper batteries (Fig. 64). If he obtained possession of the outworks, he might be be stopped for a time by the escarpment of the old wall; but that being deprived of its barbette batteries no longer presented more than a passive defense, that was destroyed without danger and without being obliged to be covered. Machiaevel also recommended already in his time, the erection of permanent ramparts with moat behind the old walls. They allowing the old walls to remain a as a primary obstacle to resist assault, or to arrest the enemy for a time, renouncing external bulwarks and projecting works, that were exposed to convergent fire from siege batteries, and being quickly overthrown, there were sometimes established behind the old fronts, that by their weakness must be chosen by the enemy as a point of attack, bastioned ramparts forming a covered work, analogous to the temporary work, that we have represented in Fig. 57. According to this principle a part of the city of Metz was fortified, after raising the siege by the imperial army about the end of the 16 th century on the side of Gate S. Barbe (73). [1] Here the old walls A with their barriers were left as they were; barbette batteries were only established in the old barriers B. The enemy making a b breach in the front C D, being weakest because not flanked, crossing the moat and reaching the place of arms E, was fired on from the two half bastions F, G, and exposed to front and rear cross fire. Outside this rampart being lower than the o old wall was masked and intact' its flanks with orillons pre-

case of defeat; for when the soldier knows that he has a safe retreat, when he has abandoned the first post, he leaves it indeed, and thus loses the entire fortress. We have a very recent example of this in the taking of the fortress of Forli, defended by countess catherine against Cesar Borgia, son of Pope Alexander VI, who came to attack it with the army of the king of France. That place was full of fortifications to which men could successively retreat. There was first the citadel separated from the fortress by a moat passed on a drawbridge, and that fortress was divided into three separate parts by m moats filled with water and with drawbridges. Borgia had battered one of these quarters with his artillery, made a breach in the wall that M. de Casal, commandant of Forli, did not t think of defending. He believed that he could abandon that b breach to retire into the other quarters. But once Borgia was master of that part of the fortress, he was soon that of the entire fortress, because he possessed the bridges separating the different quarters. Thus was taken that place previously believed impregnable, and whose loss was due to two principal faults of the engineer, who constructed it:-- 1, that he had multiplied the defenses too much; m, that he had not left each quarter the master of its own bridges." [1] Artillery had also greatly charged the moral conditions of the defense like the material conditions; as in the 13 th it was well to multiply obstacles, to build fort after fort, to subdivide the defenses, because it was necessary to attack and defend hand to hand, body to body, so it was dangerous in consideration of the powerful means of destruction by artillery, to cut communications, to encumber the defenses, for the cannon overthrew these complicated works, made them useless, and by covering the defenders with their ruins demoralized them, and deprived them of the means of resistance with the entirety.

Note 1. p. 448. Oeuv. comp. de N. Machiavelli. Edit. Buchon. 1852. See the castle of Milan (Fig. 67), that presents all the faults mentioned by Machiavel.

Already in fortification preceding the use of cannon had b been recognized, that the extreme division of defenses rendered communication difficult for a governor of the place, and even for the captain of a post, in isolated defenses like towers, keeps or gates, was felt the necessity from the 11 th and

exterior of the moat by protecting themselves by places of a arms for guarding the batteries and trenches against the night sorties of the besieged, and establish its last battery there to make the breach. It is unnecessary to state, that even before the epoch when the art of fortification was subjected to regular rules, before Errard-le-Duc, Antoine Deville, Pagan, Vauban, the engineers were compelled to abandon the last traditions of the middle ages. But starting from the rule that whatever defends must be defended, there were multiplied obstacles, commands and redoubts to infinity, and the defenses were encumbered by so many details, that men sought so much to isolate them, that in case of siege most became useless or even injurious, and that the garrisons, always knowing that they could find a second defense after the first one was destroyed, a third after the second, defended them feebly one af after another, always relying on the last to resist.

Machiavel,with the practical sense that characterizes him, already in his time had foreseen the dangers of these complications in the construction of defensive works, for in his T Treatise on the Art of War, Book 7, he says:-- "And here I m must give advice; 1, to those charged with defending a city, which is never to erect bastions detached from the walls; 2, to those who build a fortress, to never establish within its enclosure fortifications serving as a retreat for the troops, that have been driven from the first entrenchments. Here is the reason for my first advice; that is that one should always avoid beginning with a bad success, for this you will inspire mistrust of all your other arrangements, and you will cause fear in all that have taken your part. You cannot guarantee yourself from this misfortune by establishing bastions outside the walls. Since they will be constantly exposed to the brunt of the artillery, and that today similar fortifications cannot be long defended, you will end in losing them, and you will have prepared the cause of your ruin. When the Genoese revolted against the king of France, Louis XII, they built thus some bastions on the hills that surrounded them; and the taking of these bastions in some days caused the loss of the city itself. As for my second proposition, I assert t that there is no greater danger to a fortress than to have fortifications in the rear, where the troops can retire in c

C is the bridge communicating from the city to the platform (bastion). D is the tower, E the shoulders and I the flanks made sufficiently low to be covered by the shoulders.E. Scalac gives in his Treatise on Fortifications a great number of combinations of bastions; some are remarkable for that epoch.

However ingenious these expedients for defending the projecting parts of fortifications, it was soon recognized, that t they had the inconvenience of dividing the works, removing t the means of easily and rapidly reaching from the interior of the city all external points of the defense, it is so true t that the simplest rules are those finally adopted. Then the bastions were left open at the gorge, but between them and before the curtains were established detached works, that became of great utility for the defense, and which were frequently employed to prevent approaches before a weak front or old walls; to these was given the name of ravelin or half-moon, when these works appeared under the form of a little bastion, and the tenaille of two of these works was connected by a front (72 ter). A is a ravelin and B a tenaille. These works w were already in use at the end of the 16 th century during t the religious wars; their small height made them difficult to destroy, at the same time that their sweeping fire prudoced a great effect.

Also during the course of the 16 th century was given a pronounced batter to the facings of bastions and curtains to neutralize the effect of balls, for these naturally had less effect on surfaces, when they did not strike them at a right a angle. Before the invention of cannon, the batter existed only at the foot of the facings in order to remove the assailants a little and place them vertically beneath the machicolations of the defensive galleries, and on the contrary men retained the vertical surfaces in order to make scaling more d difficult.

From the moment when the bastions of assumed a new form, t the system of attack like that of defense completely changed. The approaches must be wisely combined, for the cross fire of the bastions swept the trenches and took the siege batteries in flank. Men must commence the trenches at a distance to destroy the parapets of the bastions, whose fire could overthrow the work of the pioneers, then gradually under cover reach the

and protected by the orillons from the fire of the besiegers, so as to be abke to take an assaulting column in flank and almost in rear, when it advanced to the breach. In the figure given here (72 bis), where is represented that effect, will be recognized the utility of the flanks masked by orillons; one face of the bastion A has been destroyed to permit the establishment of the breaching battery at B; but the pieces that protect the covered flank of that bastion still remain intach, and can produce great disorder among the troops sent to the assault at the moment of passing the moat, if at the top of the breach the attacking column is stopped by an internal rampart C built in the rear of the curtain from the shoulder of one barbican to another, and if the rampart is flanked by artillery. We have also shown the bastion strengthened at the gorge, the besieged foreseeing that they could not long defend it. Instead of hastily strengthening the gorge of the bastion, and often with insufficient means, men take the method of the end of the 16 th century in certain cases, to strengthen them in a permanent manner (72 bis), [1] or to isolate the bastions by excavating a moat behind the gorge, placing them in communication with the body of the place only by removable bridges or very narrow passages, easily barricaded, (72"bis); [1] men thus prevented that the taking of a bastion would immediately produce the surrender of the body of the p place.

Note 1. p. 440. Yet there exists a manuscript plan of the city of Troyes in the archives of that city, that indicates in the plainest manner great bastions with orillons and faces forming an obtuse angle; this plan cannot be later than 1530.

Note 1. p. 442. Delle fortif. di Giov. Scala to the Christian king of France and Navarre, Henry IV. Rome 1596. The Fig. here reproduced is entitled:-- "Piatta forma fortissima, etc." A is the rampart, according to the legend, of rear defense, 50 ft. thick. B is the parapet with thickness of 15 and height of 4 ft. C is the escarpment for retreat, 14 ft. high. D is the space with a slight slope to the point G. H is the flank marked by the shoulder I. K is a parapet 24 ft. thick, raised 48 ft. above the moat. Scale here is the Roman foot.

Note 1. p. 448. The same. Plate entitled "D'un buon mode etc." X is the rampart behind the curtain, according to the legend,

story in the 16 th century. The bastion has two stories of b batteries; the lower one is covered and masked by the counterscarp of the moat built like an outside wall. This covered b balltery could only serve when the besiegers descended into the moat. The reentrant angle A contains a casemate battery and is protected by the projection of the bastion and by a wall B, and commands the river. Ventilators C allow the smoke of the covered battery to escape. Beyond the bridge is the elevated rampart before the old walls and commanded by them and the towers; it has a false outwork designed to oppose the passage of the moat. One notes buttresses that strengthen the m masonry facing the rampart and extend lown into the false outwork, this is swept by the fire of the angle bastion, and by a reentrant angle of the rampart D. If it were not for the n narrowness of these spaces, this defense would yet pass for being sufficiently strong. We have given this example, although it does not belong to French military architecture; but it is necessary to remember that at the moment of transition from old to modern fortification, the different western nations of Europe rapidly adopted the new improvements introduced in the art of defending places, and necessity forced them to forget local traditions.

Note 1. p. 438. The walls of the city of Narbonne, almost entirely rebuilt during the 16 th century, some old works of the fortifications of caen, etc., present defenses built on this principle.

It appears that the Italian engineers, who were so little advanced in the art of fortification at the end of the 15 th century, as shown by the evidence od Machiavel, had acquired a certain superiority over us in the course of the wars of t the last years of that century and of the beginning of the 16 th century. From 1525 to 1530 Sanmichele fortified a part of the city od Verona, and he had already given to its bastions a form, that was scarcely adopted in France till about t the middle of the 16 th century. [1] However this may be, renouncing straight bastions, French engineers of the second half of the 16 th century constructed them with two fronts forming an obtuse angle A (72) or a right or acute angle B, so as to command the vicinity of the places by cross fire, reserving to the casemate batteries at C, sometimes even in two stories

a very important advanced work, that protects an old front of the old walls built behind a broad moat filled with water. T The curtain G is weakly flanked by the bastion, because it is dominated and enfiladed for its entire length by the lod walls of the city; as for the curtain H, it finds itself flanked by the false outwork and by the extension E of the bastion. If t the bastion could with difficulty be attacked behind the flanks of the false outwork at D, it was impossible to attack it from the side of the curtain G, for then the besiegers would find themselves taken in rear by the artillery posted on the ramparts, which command the flank I of the bastion. Men commenced them to apply with system the principle; the interior must command the exterior, and the assailants, that had become masters of the bastion, found themselves exposed to the fire from a very extended front. (68 bis). A is the front of the fortified walls, B is a wide stream, C is a covered way with barrier, terraced against the advanced work; D is a small stream, E are traverses, F are bridges, G is a rampart crossing the moat, but commanded, flanked and struck in the rear by the old walls A of the city, H is the advanced work, I is a front of the old walls lowered and fortified, K a fortified front; these two low ramparts are commanded on all sides by the walls of the city; L are bridges and M is a moat filled with water. N are bastions on land made of timbers and wicker-work, one of which is detailed in the figure (68); O are remains of old terraced defenses, P are covered ways of the advanced work. (See plan of the city of Augsburg, which presents a series of bastions constructed after the form adopted for the false outworks of the bastions of Augusta.-- Introd. a la fortification, dedicated to the duke of Burgundy. Paris. 1722.

Note 1. p. 436. Della Cosmog Univ. Seb. Munst. 1588. Location and view of the city of Frankfort, as it was in the year 1546. The bastion represented in this view commands the river (Main) and an entire front of the ramparts of the city. This fortified angle is very interesting to study, and the engraving that we have copied, seeking to make it clearer, indicates the various modifications and improvements made in the defenses of places during the 16 th century. There has been retained at the centre of the new bastion the old corner tower, that serves as a watch tower; this tower was evidently raised a s

in the gorge A (69 bis) for the use of artillery; their narrowness made it difficult to defend them when the enemy, after taking possession of the bastion, sought to penetrate farther. We have seen how before the envention of cannon, it was difficult to oppose to a column of assault narrow but deep, striking the tops op the walls, a front of defenders sufficiently deep to drive off the assailants (Fig. 16); the artillery opening on the bastions or curtains made practicable breaches, in consequence of the earth falling outwards, the assaulting column could then be not only deep but present a great front; it was then necessary tc oppose to it a front of defenders at least equal in order to not risk being flanked; the narrow g gorges of the primitive circular bastions, even if well fortified internally, were easily taken by the assaulting columns, whose impelling force had great power. Soon were perceived the serious inconveniences attached to narrow gorges, and instead of retaining for bastions the circular form, they were given a front B and two cylinders C termed orillons. [1] These bastions swept the moats by means of masked guns behind the orillons, but only defending themselves in front, did not resist oblique fire, and particularly did not protect each other; i indeed (71) their fire could not cause any injury to a breaching battery placed at A, which was struck only from the curtain. men were so occupied with the defense near at hand, and in giving to each part of the fortification a strength suitable for it (and this was a remnant of the feudal military architecture of the middle ages, when each work, as we have shown, defeuded itself and was isolated), that the straight fronts C D were regarded as essential, which should destroy batteries placed at B, reserving only the fire E for sweeping t the moat for the moment when the enemy attempted to pass the moat, and to deliver an assault by the breach made at G. This last vestige of the traditions of the middle ages was now effaced, and from the middle of the 16 th century was generally adopted a form of bastion, that gave to the fortifications of places a strength equal to the attack, up to the moment when the siege artillery acquired an irresistible power.

Note 1. p. 434. See Arts. Bastile, Bastion, Boulevarde.

Note 2. p. 434. Della Cosmog. univers. Sebast. Munster. 1858. La Citte d'Augusta. p. 878. The bastion here given depends on

the counterscarp of the moat. When during the first half of the 16 th century the old curtains and towers of masonry were replaced by the new defenses, while retaining for them an elevated command over the country, and giving a great diameter to the towers with very thick masonry (as we have shown in Figs. 49, 50, 51),and to the bastions a strong projection from the curtains, they were occupied with:-- 1, protecting their fronts against the converging fire of the hostile batteries; for that purpose were established around the circular bastions and at their bases false outworks masked by the counterscarp of the moat, and to render these stronger, they were flanked sometimes. This was already a great advance, for the circular bastions, like the round towers, were weak if taken in front, opposing to the convergent fire of a breaching battery only one or two guns. Here is an example of one of these false outworks. (68).[2] When the besieger had destroyed the battery p placed at A, had completed his work of the approaches, and ap- appeared on the crest of the glaces at B, it was necessary for him to defeat the defenders of the covered way protected by an embankment and a palisade; if he succeeded in reaching the moat, he was received by the sweeping and crossed fire of two guns placed in the sides of the false outworks at C, and by the musketry of the defenders of that lower work, protected until the moment of assault by the counterscarp of the moat. To fill up the moat under the crossed fire of two guns was a very dangerous operation; it was then necessary to destroy t the false outworks and its flanks C by cannon. If it was desired to turn the flank and take the outwork at D by scaling, he was received by pieces masked by the second flank E. Finally when these obstacles were passed and the bastion was taken, the assailants still found the old defenses F retained and m much higher, the lower part being masked by the height of the bastion, and could be filled with artillery or musketeers. 2, to mask the artillery intended to defend the curtains, when these were destroyed, and the besiegers attempted the passage of the moat to take possession of the breach. To obtain this result, the engineers in the 16 th century, as we have already seen, gave a great projection of the round bastions beyond t the curtains, so as to form a reentrant angle in which were arranged embrasures for cannon.(69).[1] But space was lacking

besiegers, and could only oppose a passive defense to the cross fire of the siege batteries. Accumulating obstacles, the retarded the workspof the enemy without being able to destroy them; the bastions or platforms were then multiplied, i.e., instead of only building them before the gates as at Hull with a special purpose, they were established at different distances to keep back the approaches, and to shelter from t the fire of the enemy the old fortified fronts, that were retained. [1] In the description by Machiavel already mentioned, of the fortifications of Florence, we still read these passages concerning the establishment of round bastions before the ancient fortified fronts; "When one has passed along the road from S. Giorgio about three hundred yards, he meets a reentrant angle forming the wall by changing the direction at that point to turn to the right. The opinion of the captain was, that it would be useful to erect at that place a casemate or a round bastion, to sweep the two flanks; and you know what he means by that, which is that ditches are excavated everywhere that walls are found, because he is of opinion, that d ditches are the primary and the strongest defense of places. After we had advanced about three hundred yards further, to a place where some counterforts are found, he was of opinion, that there should be constructed another bastion; and he thought that if it were made sufficiently strong and advanced, it might render useless the construction of the bastion of t the reentrant angle previously in consideration."

Note 1. p. 432. Defenses of the city of Marseilles. Topog. de la Gaule. Merian.

Note 1. p. 433. Defenses of the city of Blaye. The same.

"Beyond that point is found a tower, whose extent should be increased and its height diminished, according to his opinion, by arranging it so that one could handle on its top great pieces; he thinks it would be useful to make such of all the other towers that exist; he adds that the nearer they are together, the more they add to the strength of a place, not so much because they strike the enemy in flank, as because they reach him from the front."

Nearly always these bulwarks or bastions (for we can henceforth give them this name) [1] were only earthworks with a facing of timbers or masonry, rising little above the crest of

to take obliquely the siege batteries, or to command a deep breach and to sweep the moats, when the side embrasures of the bastions were destroyed by the enemy's fire. In the permanent state these cavaliers were frequently erected to dominate passages, roads, gates and especially bridges, when these at the end opposite the city ended at the foot of a hill, on which the enemy could establish batteries designed to protect an attack, and prevent the besieged from remaining in force on the other side. The gate of Marseilles crossing the ravine, that formerly cut the road to Aix was defended and swept by a great cavalier placed at the city side.(67 bis). [1] If the bastions were tso far apart to properly flank the curtains, cavaliers were erected between them and the middle of the curtains, either in semicircular or square form to strengthen their fronts; ewen on the bastions it was also the custom to erect t them for the purpose of increasing their domination, and thus being able to place two tiers of batteries. These cavaliers still presented the advantage of protecting the curtains, the besiegers having retained at the beginning of the 16 th century the tradition of the offensive forts of the middle ages, and frequently establishing their siege batteries on terraces sufficiently elevated above the ground of the country. Without cavaliers, when the besiegers planted their batteries on an elevation, either by terraces or by the nature of the exterior, commanding or sweeping the tops of the defenses of the place, and taking them obliquely or enfilading them, they could destroy the barbette batteries of the besieged at a great distance and for a great length. There were constructed from the 16 th century traverses A (67 ter) of earth, sometimes furnished with gabions B at the moment of attack to increase their height.

Note 1. p. 431. German engraving of the 16 th century from the cabinet of M. Alfred Gerente.

Note 1. p. 432. View of the city of Marseilles. Topog. de la Gaule. Martem.

But men did not delay in recognizing the inconveniences of works forming considerable projections to the exterior, not connected with a general system of defense; they were not flanked; compelled to defend themselves in isolation, they presented only a point on which converged the fire of the besieg-

to remove it and to construct there a round bastion, to place the exit at the flank, according to custom." Here (67) is a cavalier view of the castle of Milan as it existed at the beginning of the 16 th century, [1] that illustrates the system of defense and of attack of places in the time of Francis I. One notes here the mixture of old and new defenses, an incredible confusion of towers, of forts isolated by ditches. At A the besieging army has established batteries behind ramparts of gabions, protected by forts B, a sort of circular redoubt of earth taking the place of modern places of arms, but commanding the front works of the besieged. At C are seen the ramparts flanked by towers before the gates, at D are curtains w without terraces, but crowned by walks; in the ground story are arranged covered batteries with embrasures around at F, while the upper parts appear entirely reserved for crossbow men, archers or musketeers, and are still equipped wit their machilocations. At F is a rampart surrounding the weakest part of the castle, from which it is separated by a moat filled w with water. This rampart at the left rests at G on a work well flanked, and at the right in H is a sort of fort or keep defended according to the old system. From these two works the body of the place is reached by drawbridges. The castle is d divided in three parts separated by moats, that can be isolated. Before the gate found on the first plane at I and along the edge of the moat is arranged a covered way to prevent the enemy from taking it in flank and destroying it. But it is e easy to understand that all the works are too small, not permitting sufficiently extended flanks, that they can be rapidly overthrown one after another, if the besieger possesses abundant artillery, its converging fire continuing to batter with a change of direction alone. Thus at that epoch already, to prevent these too closely grouped works from being destroyed at the same time by a single battery, that could enfilade them from quite near, there were raised in the interior of places in the middle of bastions, circular or square terraces to batter the terraced forts of the besiegers. This work was frequently employed during the 16 th century and later, and took the name of cavalier or platform; it became a great resource for the defense of places, either when permanent or when built during the siege itself, to discover the lines of trenches,

of earth forming a covered way. Thus gradually were commanded the approaches of the besiegers; a need was felt for fortifying the exterior, of protecting cities by works sufficiently projecting to prevent siege batteries from shelling the houses and warehouses of the besieged; it was particularly along navigable rivers and ports, that were already established in the 15 th century forts connected by ramparts, so as to protect vessels from projectiles. The cities of Hull in Lincolnshire, Lubeck in Holstein, of Libourne, Bordeaux, Douai, Arras, Liege, Basle, etc., possessed forts suitable to receive cannon. We give here the plan of the line of forts of Kingston-on-Hull reproduced by M. H. Parker (66 bis).[1] As for the forts of Lubeck, they were detached or connected with the solid ground by jetties, and thus formed very considerable projections surrounded by water on all sides (66 ter). [1] The latter forts s seem to have been built of logs, wicker-work and earth.

Note 1. p. 425. Gate Mozelle at Metz. Topog. de la Gaule. Merian. 1655.

Note 2. p. 425. Gate de Lectoure. From the same.

Note 1. p. 427. Some account of Domestic architecture in England from Edward I to Richard II. Oxford. J. H. Parker. 1 1853. The castle of Kingston-on-Hull was founded by king Edward I after the battle of Dunbar, but the fortification reproduced here was certainly of a date later than that epoch, probably from the end of the 15 th century. M. Parker justly remarks, that these were conformed to the outworks adopted in France.

Note 1. 428. From an engraving of the 16 th century taken from the cabinet of the author.

The method of defending gates by bastions or circular ramparts was applied in France from the time of Charles VIII. Machiavel in his Treatise on the Art of War, Book 7, thus expresses himself. "But if we have something demonstrable (in the matter of military institutions), we owe it entirely to men beyond the Alps. You know and your friends can recall, what was the state of weakness of our strong places before the invasion of Charles VIII in Italy in the year 1494." And in his description of a visit of inspection of the fortifications of Florence is noted this passage: -- "We then came to the gate S. Giorgio (left bank of the Arno); the advice of the captain was

for they were easily destroyed; once lodged in those outworks, the enemy fortified himself there, erected batteries and destroyed the gates. First on these points was fixed the attention of the constructors of fortifications. From the end of t the 15 th century men were then occupied first of all in fortifying the gates, the bridge-heads, in flanking the gates by dedenses suitable to receive artillery, profiting as much as possible by the old arrangements and improving them. Gate Mazelle (65) of the city of Metz, [1] was strengthened in that manner; the old barbican at A was lowered and terraced for p placing cannon; the curtain B was strengthened internally, and that at C was rebuilt so as to cover the first gate. But these compact and narrow defenses did not suffice; the defenders being somewhat above the others, the siege batteries before the works were massel at one point, destroyed all at the same time, and brought disorder among the defenders. They soon yielded to the necessity for enlarging the defenses, of carrying them outside, of commanding a greater area of ground. Then were e erected outside the gates ramparts to shelter them from the effects of artillery (66); [2] sometimes these ramparts were f furnished with false works for placing musketeers; if after destroying the parapets of the ramparts and dismounting the batteries, the enemy came to the ditch, these musketeers retarded the assault. Already a great extent was given to the o outworks, to have places of arms before the gates. The power of artillery had as a result a gradual extension of the fronts, od causing the abandonment of the old enclosures, upon which men had always sought to rely as much by tradition as by a mo motive of economy. Cities adhered to their old walls, and could not abruptly accustom themselves to regard them as scarcely obstacles; if necessity required them to be modified, this was nearly always by works having a temporary character. The new art of fortification was scarcely foreseen, and each engineer by experiments sought not to establish a general and n new system, but to retain the old walls by outworks, rather than by an entirety of permanent defenses arranged with system. Yet these attempts must necessarily lead to a general result; men soon extended the moats before and behind the ramparts of the gates, just as before practised for some barbicans, and at the outside of these ditches were established the ramparts

protected by gabions filled with earth and set vertically. Th These great gabions also served to mask pieces in battery; t the interval between the gabions formed an embrasure.(63).[2] When the besiegersby means of trenches succeeded in establishing their last batteries very near the place, and [redacted] furnished with good external ramparts and walls of considerable height, and they were forced to protect their breaching battery against the sweeping and plunging fire by banks of e earth surmounted by gabions or palisades strongly connected and filled with earth. These works could only be executed during the night, as still practise in our days.(64).[1]

Note 2. p. 419. From the end of the 16 th century, French artillery had adopted six calibres of cannon; the guns with a length of 10 ft., and whose ball weighed 33 1\3 lbs.; the culverin with a length of 11 ft., and with a ball weighing 16 1\2 lbs., the bastard with a length of 9 1\2 ft. and a ball of 7 lbs.; the medium with length of 8 1\6 ft. and a ball of 2 3\4 lbs.; the falcon with length of 7 ft. and a ball of 1 1\2 lbs.; the falconet of 5 1\3 ft. with a ball of 14 oz. La Fortification, by Errard de Bar-le-Duc. Paris. 1620.

Note 1. p. 423. See Le Roi sage. Recit des actions de l'empereur Maximilion I, by Marc Treitzsaurwen, with engravings by Hannsen,[redacted].Pub. 1775. Vienna. (The engravings in this work date from the beginning of the 16 th century).

Note 2. p. 423. The same.

Note 1. p. 424. See the Note on the preceding page.

While perfecting the defense by strengthening the walls by ramparts of wood and earth outside the moats or against the external surfaces of these walls themselves, it was still recognized that these means of rendering the effect of the artillery less terrible and less rapid, only retarded the assault by some days, that an invested place seeing breaching batteries promptly rise at a little distance from the ramparts, found itself shut up within its walls without being able to communicate with the outside. Agreeably to the method previously employed, the assailants again directed their forces against the gates at the end of the 15 th and the beginning of the 16 th centuries, the old barbicans in masonry or wood (ramparts) were no longer sufficiently spacious or well flanked to compel the besiegers to execute the great works of approach,

troops, and the attacks on strong places frequently mention it. Besides the means indicated above, either to place the walls in condition to resist cannon, or to present a new obstacle to the assailants, when they had succeeded in overthrowing them, the places were strengthened, i.e., there were established o outside the moats at the top of the counterscarp, or even as a protection of the wall to lessen the force of the ball, or within it at a certain distance, ramparts of wood and of earth, the first forming a covered way or a facing of the wall, and the second being a rampart behind which was placed the artillery; 1, to delay the approach and to prevent a sudden attack, or protect the wall from the effect of cannon; 2, to stop the besiegers when the breach was practicable. The former replaced the old barriers, and the latter obliged the besiegers to make a new siege, when the euclosing wall was overthrown. The ramparts stopped the balls and resisted longer than masonry walls, they were more capable of receiving and protecting guns in b battery, than the old wall terraces. They were constructed in various ways; the strongest were built with an external facing of vertical timbers connected by X crosses, to protect the w work from being dislocated when the balls broke some parts. Behind this timber surface were fascines of small pieces of wood interlaced like basketry, then was raised a terrace composed of wickerwork with alternating layers of earth; sometimes the rampart was formed of two rows of strong piles set vertically and connected by flexible branches and ties set horizontally (60); the interspaces were filled by rich earth well tamped with pebbles removed and mixed with slender bits of w wood. Or indeed trunks of trees were laid horizontally and c connected by ties halved iu, the interspaces being filled in the same way.(61). At certain distances were arranged embrasures filled with shutters. If the besieged were taken unaware, or if they could not procure suitable earth, they were satisfied to interlace trees with their branches attached to a part; the intervals were filled by fascines.(62). [1] These new obstacles opposed to the siege artillery caused the use of shells, loaded projectiles, that burst in the midst of the rampart, and caused great disorder there; gradually it was necessary to renounce sudden attacks, and only approach places thus fortified iu trenches with their angular or rounded curves prot-

two ends, and to place in each four or five great pieces of artillery, loaded with great chains, great spikes and pieces of iron. Behind the retrenchment I decided to place all the muskets of the city with the musketeers, and when they were within, to have all the artillery and musketeers suddenly fire a shot; and we at the two ends came running to them with pikes, halberts, swords and shields." This provisional arrangement did not fail to become a fixed system, as we shall soon see.

Note 1. p. 418. The name of merlon was given to the portion of the parapet below the battlements and embrasures.

Note 1. p. 419. Comment. du. marec. du Montluc, edition Buchon. p. 142.

When the effects of artillery were well known, and it was confirmed that masonry walls 6.6 to 9.8 ft. thick (which was the average thickness of curtains before the regular use of cannon) could not resist a battery throwing from three to five hundred balls on an area of about 86 sq. ft.,[2] while reducing the height of masonry walls, they employed various means to give them greater resistance. In structures preceding artillery, to resist mining, undermining and the battering ram, already discharging arches were built in the thickness of the wall, masked by the external facing, that transferred the weight of the masonry to isolated points, supported the parapets and prevented the walls from falling in a single mass, unless the besiegers had accurately undermined the concealed points of support (58), which could not result from choice. In the 16 th century was perfected this system; not only were discharging arches built in the thickness of the curtains of masonry, but they were strengthened by internal buttresses buried in the terrace and abutting the facing by means of vertical tunnel vaults.(59). They took care to not bond these buttresses with the solid part of the walls for their entire height, to avoid having the facing fall from the effects of the balls and carry the buttress with it; these internal projections a again by supporting the earth packed between them would present an obstacle overthrown with difficulty. But these means were expensive; besides they always assumed walls forming a terrace considerably higher than the inner bank of the moat. The elevated domination was abandoned with difficulty, for at that time scaling was still frequently attempted by the besieging

facings usually with a thickness of only 1.0 to 1.6 ft were q quickly broken by the effect of iron balls, that they separated from the mass, leaving it exposed to projectiles; that t the stone parapets carried away by balls broke into fragments, actually more dangerous than the balls themselves. Defensive architecture, in order to prevent the destruction of the old walls and towers, added to the curtains internal terraces of earth, and sometimes filled the lower stories of towers. But when the wall fell under the shots of siege artillery, this mass of earth falling outward with it, facilitated access to the breach by forming a natural slope, while the walls alone without internal terraces in falling only presented irregular breaches of very difficult access. To avoid these inconveniences, when the old fortifications were retained, and they were employed as defense against artillery, men sometimes filled the internal towers with longitudinal timbers, resinous or o calcined branches to protect them from decay; these terraces were sufficiently consistent to not fall outward when the wall fell, and made the breach impracticable. If the old walls had been simply terraced inside, so as to allow placing guns at the level of the parapets, if the ancient battlements had been replaced by thick parapets and embrasures in masonry, when the besieged were certain of the point attacked, and while the b besiegers made their final approaches and battered a breach, there was erected behind the front attacked a terrace of wood, low enough to be concealed from outside, and a ditch was dug between that work and the breach; when that became practicable the besieger sent in his attacking columns, which found themselves before a new and improvised rampart well equipped with artillery; a new siege was to be commenced again. This reentrant work was very difficult of access, for it was flanked by its natural arrangement, and the assailants could no longer think of a sudden assault,the attacking columns finding themselves struck in front, in flank and even in rear. When Blaise de Montluc defended Siena, he erected behind the old walls of the city and at points where he assumed they would be battered, reentrant ramparts of the kind represented here. (57). "Now I considered," says he, "that if the enemy comes to attack with artillery, to intrench myself along the wall that he would b batter, to allow them to enter with ease; to always close the

market. We give the only story that remains, which is the lower one. The plan is at the scale of 1\454 full size.

Note 1. p. 413. We owe to M. Millet, architect attached to the Commission de monuments Historiques, the drawings of this defensive work.

Note 1. p. 414. The adjacent curtains date from the 13 th century. To M. Abadie we owe the very accurate drawing of this defensive work.

Note 2. p. 414. See Arts. Tour, Meurtriere.

Note 1. p. 417. We borrow this passage from Precis historique de l'influence des armes a feu sur l'art de la guerre, by prince Louis Napoleon Bonaparte, President of the republic.p. 103. (Extract from the Chronicle of Molinet. Vol. 5. Chap. 283. p. 42.

Always retaining in the fortresses erected toward the end of the 15 th century the towers and curtains of the inner walls commanding the country to a great distance by their height, and again crowning them with machicolations, the thickness of the masonry was increased to be able to resist siege artillery. When the constable of S. Pol in 1470 caused the reconstruction of the castle of Ham, he not only **believed that he should furnish** that retreat with advanced works, walls as counter guards, but he gave the towers and curtains, and especially the great tower or keep such thickness, that these structures could even oppose a long resistance to modern artillery. (Art. Chateau).

Until then men had been occupied with the reasons for the new needs of modifying the form and location of towers and curtains, the details of the defense; but since the 11 th century the mode of construction of fortifications had not changed; there were always two faces of cut stone, brick or rubble enclosing a mass of irregular masonry. This sort of construction was very good against undermining or the battering ram, for pioneers broke through with more difficulty a mass of masonry of small stones and mortar, that was hard and adherent, than a jointed structure easy to displace when some stones had been removed, structures of cut stone never being as homogeneous as well built rubble. The masses of masonry better resisted the strokes of the ram than cut stone masonry, But when cannon replaced all machines and methods of destruction employed in the middle ages, it was soon recognized, that stone

which and the said walls were certain moats of sufficient depth, and again before the said outworks were other great moats of great depth, some with some with crests, full of water and of great breadth, which surrounded the city and its forts as far as the flowing rivers. Four principal gates of such a sort, and some posterns and projections embellished and greatly fortified the said enclosures; for each one of these had in front its bulwark like a bastion, great, strong and defensible, equipped with every instrument of war, and particularly with powder charges already loaded." We see in that description t the bastion is clearly discribed as an important accessory of the defense to fortify projections, posterns, gates, and to s sweep the moats, to take the place of the towers and barbicans of the old fortifications, of the old isolated forts, works of defense outside the gates. Soon that accessory, whose utility was recognized, becomes more important that the main wall, and forms the principal part of modern fortification.

Note 1. p. 407. Copied from the vignettes of the manuscript of Froissart, 15 th century. Bibl. Imp. No. 8320. Vol. 1. The cannon are found in the vignette entitled:-- "How the king of England besieged the city of Rains. How the city of Duros was besieged and taken by assault by the French." These guns were originally made of wrought iron bars like the staves of a cask, encircled by other cylindrical iron bands; when of small calibre, they were either forged or cast in iron or copper. (Art. Engin).

Note 1. p. 409. These figures are taken from the manuscript of Froissart already cited. One of the crossbow men is photected (48), i.e. he carries on his back a broad shield attached to a belt, in turning around to strain his crossbow, he finds himself protected from hostile arrows. The iron ring fastened to the end of the crossbow served to pass through the foot, when he wished to use the double crank to strain the bow.

Note 1. p. 411. This plan is from the Topographie de la Gaule, edition of Fraukfort; Merian. 1655. The greater part of these fortifications still exist.

Note 1. p. 412. The advanced work indicated in this plan h has been replaced by an important momern defense across the road from Dijon.

Note 2. p. 412. This tower is called today Tower of the Mor-

established batteries with sweeping fire, that replaced the barriers mentioned in the course of this Article. Men then began to free themselves from the rules so long retained for fortifications preceding the use of artillery. In a pressing case, the old walls and towers of the barriers, the barbicans were simply removed to the level of the terrace at top, they crowned by parapets with embrasures for placing there barbette batteries. (54). Towers appear so much an indispensable means of defense, and they are regarded as of such great utility in dominating the country, that they were still erected even after the false works arranged to flank the curtains had been adopted. First were given to the false works in plan the forms, that had been given to palisades, i.e., they nearly followed the outline of the wall, but they were soon made flanking works. The city of Orange had been fortified anew under Louis XI, and such was the form of its defenses at that epoch.(55). By means of these modifications places were in condition to resist artillery; but this arm was rapidly perfected. Louis XI and Charles VIII possessed formidable artillery, the art of the siege became more systematic daily, and at that epoch regular approaches were already made; when the attack could n not be sudden, they began by making trenches, establishing p parallels and actual siege batteries well covered by gabions. The walls rising above the tops of the banks of the trenches presented an easy aim for the direct fire of siege batteries, and at quite a great distance could be destroyed the uncovered works and a breach be made. To guard against that inconvenience the outside of the moat was furnished with a palisade or a parapet of masonry or carpentry with terraces and an outer ditch; this work replaced the ancient barrier and retained t the name of outwork.(56). There were established outside gates, posterns and projections, earthworks strengthened by wooden timbers, that were still called bulwarks, forts or blockhouses. The description of the fortification of Nuys, that Charles the Rash besieged in 1474, perfectly explains the method employed to resist attacks. [1] "Likewise Nuys notably had towers of sandstone, powerfully walled with rich "fremete", high, spaced and reinforced by strong bastions, skilfully composed of stone and brick, and in no place entirely of earth, arranged for defense by wonderful skill for repelling the assailants; between

not hold out before an army equipped with artillery, and history in that period no longer exhibits those long sieges so common during the 12 th, 13 th and 14 th centuries. Men did the best possible to adapt the old fortifications to the new mode of attack and of defense, either by allowing the old walls to remain behind new works, or by destroying some weak pa parts as at Langres, to replace them by great round or square towers furnished with artillery. At the end of the 15 th century, engineers appeared to seek to cover cannon; they arranged them in the ground stories of towers in covered batteries, reserving the tops of the towers and of curtains for archers and crossbow men or musketeers. There still exist a great number of towers, that present this arrangement; without mentioning that of Langres already given (Figs. 49, 50, 51), but whose destroyed tops cannot serve as an example, yet here is a square tower belonging to the very old defense of Puy-S.Front of Periqueux, and that was rebuilt to contain guns in the ground story [1] intended to sweep the river, the bank and one of the two curtains. The ground story of this little tower (52) is pierced by four embrasures designed for small guns, without counting a slot in the projecting angle of the side next the river. Two guns (whose places could be changed according to the needs of the defense) could only be placed in that low b battery, covered by a thick tunnel vault of cut stone, and p proof against solid projectiles thrown by mortars. The embrasures of the cannon (53) are pierced horizontally to allow just space for passage of the ball, a horizontal slot above permitting the aiming and serving as a vent for the smoke. A straight stairway leads to the second story pierced only by slots for crossbows or muskets, and the top has machicolations with a continuous parapet without battlements, but pierced by round holes suited to the muzzles of little guns or muskets. [2] This was but a mediocre defense, and it was easy for the enemy to locate himself, to find himself out of range of the fire. Men soon recognized, that these covered batteries established in small rooms, and whose embrasures comprised only an acute angle, could not dismount siege batteries, and caused no serious injury to the besiegers. Then allowing the old defensive system to remain to receive archers, crossbow men and musketeers, false works were built before them in which could be e

century. We give (49) the plan of one of the towers, whose erection dates back to the end of the 15 th century or the beging of the 16 th. [2] This tower is an actual bastion able to c contain 5 guns in each story. Built on a steep slope, one descends four flights of steps from the point C in the city to t the point E. The embrasures E, F, G, are stepped to follow the inclination of the ground, and to be always at the same height above the external ground. Guns could easily be introduced by the wide aud gentle flights of steps; the walls are thick (23) ft.), to be able to resist the artillery of the besiegers. The first bay with parallel walls is covered by four vaults resting on a column; a transverse arch bearing on two ends of walls separates the first bay from the second, which is covered by a half dome. (See the longitudinal section (50) on the line C D and the transverse section (51) on the line A B of the plan). The embrasures F, G (49) were closed in the interior by shutters. (Art. Embrasure). Vents that allowed the smoke to escape from the interior are at H. Two little recesses I received t the store of powder. This tower was originally crowned by a platform aud a parapet with battlements, behind which were p placed other guns or musketeers. These upper parts were changed long ago. The barbette battery is wider than the top of the parapets of the adjacent curtains by about 3.3 ft.; this was a remainder of the tradition of the middle ages. It was always believed necessary for the towers to command the curtains. [1] (Art. Tour). This uncertainty in the construction of defenses during the early time of the artillery gives a great variety of arrangements, and we cannot indicate all. But it is well to state that the system of fortification so well established from 1300 to 1400, so methodically arranged, was d disturbed by the use of cannon in sieges, and that experiments began after that last epoch to cease only in the 17 th century. Such was the power of feudal traditions, that men could not abruptly break with them, and they were still retained, in s spite of experience of the inconveniences connected with mediaeval fortifications opposed to artillery. Thus were seen f for a long time and until during the 16 th century, machicolations employed at the same time as covered batterier, although the machicolations were no longer any defense against cannon. Also from Charles VIII to Francis I, cities end castles could

under Charles VII many attacks on castles and cities were sudden and successful. Guns were brought without protection before the fortifications, and before the besieged had time to place in battery some mortars and wheeled guns that equipped the to towers, the breach was made and the city was taken. But all the towers could not be adapted to the modification required by the service of the artillery of the defense; their internal diameter did not permit the placing of a gun; it could not be introduced by crooked passages and winding stairways, and then after the pieces had fired two or three shots, men were suffocated by the smoke, that found no exit. Thus men began by modifying the construction of towers, giving them less height and increasing their diameter to project externally; renouncing the old system of isolated defense, they were open on the side toward the city, so as easily to introduce the guns, and lateral embrasures were opened below the level of the crest of the moat, sweeping this for its length. The fortifications of the city of Langres are very interesting to study from the point of view of the modifications made during t the 15 th and 16 th centuries in the defense of places. (48) [1] Langres is a Roman city; the part A of the city was added at the beginning of the 16 th century to the ancient enclosure, in which is found a very well preserved gate; successively m modified, the enclosure of Langres was almost entirely rebuilt under Louis XI and Frarois I, and it was later strengthened by defenses established according to the system adopted in t the 16 th and beginning of the 17 th centuries. The use of a artillery caused the building of the towers C, that flank the curtains by means of two parallel walls ending in a semicircle. The city of Langres is built on a plateau, that dominates the course of the Marne and the entire vicinity; on the side D a alone can it be reached on the land. Thus at this side had b been established a very strong advanced work in the 16 th century. [1] At E was a second gate, well defended by a great round tower or fort, with two covered batteries placed in two chambers with vaults resting on a cylindrical pillar built at the centre; in another adjoining tower is a spiral ramp that allowed guns to be taken up on the platform crowning the great tower (Art. Bastille); at F is a third gate opening on the Marne and protected by earthworks of the end of the 16 th cen-

battlements, it was necessary to have archers and crossbow men in great numbers; particularly archers who had, as we have s seeu, a great superiority over crossbow men becamse of rapidity of firing with the bow. Each archer (44) was equipped with a leather bag containiug two or three dozen arrows. At the moment of combat, he dropped his bag on the ground, and he kept several arrows under his left foot, the heads at the left; w without looking he felt them and could take them singly by l lowering his hand without losing sight of the aim (an important point for an archer). A good archer could shoot a dozen arrows per minute. While a crossbow man during the same time could scarcely shoot two bolts. (45, 46). gompelled to fit t the double crank to his weapon (47) after each shot to bend the bow, he not only lost much time, but he lost sight of the movements of the enemy, and was obliged when his weapon was ready, to seek his aim and shoot. [1] When firing artillery was well mounted and sufficiently numerous to batter the walls a and breach them at a distance, the ancient defensive system appeared so inferior to the means of attack, that it was necessary to thoroughly modify it. The towers covered by roofs and for the most part of small diameter, vaulted in quite a light manner, could not serve for placing cannon; by removing the roof and making platforms (which was frequently done at the middle of the 15 th century), men succeeded in placing one or two guns on the top, that caused no great damage to the as assailants, and that by their plunging fire could strike but one point. It was continually necessary to move them to follow the movements of the attack, and their recoil often shook the masonry to the point of injuring the defenders more than the besiegers. On the curtains the terraces had scarcely 6.6 ft. in width at most, and could not receive guns, then were formed in the interior banks of earth at the level of the terraces, so as to mount the pieces in battery; but because of the height of these curtains, the plunging fire produced no great effect. Therefore without omitting to place artillery on the tops of the defenses wherever practicable, embrasures were opened in the lower stories of the towers at the level of the counterscarp of the moat, so as to obtain a sweeping fire for sending projectiles to rebound, and to force the assailants to make deep trenches in approaching places. Indeed

"This day (next the last)of February, 1429), the bombardment of the city by those assembled at the bend of the mills of the postern Chesnau to fire on the towers, shot so terrebly agoist them, that a great piece of the wall was broken down."(The Same).

"The French brought a gun to bear on the said castle of Harcourt, and at the first shot made, is pierced entirely through the walls of the lower court, that is quite the equivalent of the castle, which is very strong. Alain Chartier. p. 162. 1449.

To besiege the city, the English followed yet the old system of wooden forts and of ramparts; they ended by being besieged in their turn by those of Orleans; they lost their forts successively, which were destroyed by the fire of the French artillery; vigorously attacked, the were obliged to raise the siege by abandoning a part of their material; for the firing artillery for a siege, like all the machines employed until then, had the inconvenience of being transported with difficulty, and it was rarely that under Charles VII and Louis XI that siege guns as well as field guns were mounted on wheels; yet they continued to employ mortars (great pieces for throwing stone balls of great diameter) until during the first years of the 16 th century. Here (42) is a representation of a double siege gun equipped with its wooden shield designed to protect the gun and men from projectiles; (43) represents a double gun with cases fastening in the breech and containing the charge of powder and the ball. [1] Beside the gun are other cases for exchange and the measure C with handle for measuring the charge of powder; (43 bis) the drawing of a cannon with case mounted on a carriage with racks for directing the gun. The balls of this last cannon are of stone, while those of t the double guns are of metal. The powder enclosed in the case was fired by means of an iron rod made red hot in a furnace. The placing of these cannon in battery, loading them, especially when it was necessary after each shot to exchange the c cases, and the accessory means of firing; all that was lengthy. At the beginning of the 15 th century guns of great calibre employed in sieges were in not sufficient number, were too d difficult to transport, could not be loaded rapidly enough to produce quick and decisive effects in the attack of places. To keep the defenders away from the batteries, it was necess-

who recently borrowed from the cities their cannon to make a attacks at several places at the same time, which justly excited the admiration of contemporaries. By the creation of companies of regulars and the establishment of the free archers, the king acquired cavalry and infantry independent of the nobility."

The use of cannon in sieges must have as a first result the suppression everywhere of defensive galleries and wooden towers, and must contribute to the establishment of machicolations and stone parapets with battlements borne on corbels projecting from the face of the walls. For the first guns appear to have been employed frequently, not only to throw round stones like balls , like machines with counterpoises, but also incendiary projectiles, little kegs containing an inflammable and explosive composition, such as the Greek fire described by Joinville and known from the 12 th century by the Arabs. At the end of the 14 th century and the beginning of the 15 th, artillerists already employed cannon to throw horizontally balls of stone, lead or iron; then were not alone attacked the battlements and upper defenses of the walls, but they were breached at the base; actual siege batteries were established. At the siege of Orleans in 1428 the English cast into the city with their mortars a considerable number of stone projectiles, that passed over the walls and broke through the roofs of the houses. But on the side of the French was found artillery with direct fire, that caused great loss to the besiegers; a b ball killed the count of Salisbury, who was looking at the city through a window of a tower. [1] It was a man risen from the people, master Jean of Lorain, that directed the artillery of the city.

Note 1. p. 408. "During the feast and service of Christmas, a terible fire was made by one party and the other with mortors and cannons; but particularly much injury was done by an artillerist, a native of Lorraine, being then of the garrison of Orleans, named master Jean, who was said to be the best m master in this work, and he showed it well; for he had a great gun that he fired frequently, being in the pier of the bridge near the rampart of Belle-Croix, so that he killed and wounded many English. Hist. et desc. au vray du siege qui fut mis devant la ville d'Orleans. (Orleans. 1611).

Artus III, duke of Brittany and constable of France, recently brought to light. By T. Godfrey. 1622.

At the siege of Orleans in 1429: "On Thursday, the the day of March, the French in the morning sallied against the French, making for this a trench so as to go under cover from their rampart of Croix-Boissee to S. Ladre of Orleans, that the French could neither see them nor fire on them with guns and m mortars. This sally did great damage to the English, for nine of them were taken prisoners, and besides master Jean of a gun killed five at two shots." Hist. et desc. du siege qui fut mis devant la ville d(Orleans. (Orleans. 1611).

Note 1. p. 405. "Siege was laid to Cherbourg. And my said l lord lodged at one side and lord de Clermont on the other. A And the admiral de Coitivi, and the marshal and Joachim on t the other side before a gate. And the siege was indeed a month, and they broke and injured 9 or 10 mortars, large and small. And the English came there by sea, among others a great ship named Henry, and there commenced a little sickness, and the lord was much troubled, for he had the entire charge. Then f four guns were placed on the strand when the sea retired. And when the sea returned, all the guns were covered, shields and all, and all were loaded and so skilfully arranged, that when the sea retored, they were fired and made as good shots as if they had been on firm ground." Hist d'Artus III. p. 149.

"The moral effect produced by great artillery became so great, that its appearance sufficed to cause the cities to surrender.

Let us say then in honor of the army, that it was as much to t the advance in artillery , as to the heroism of Joan of Arc, that France was indebted in being able to shake off the foreign yoke from 1428 to 1450. For the fear that the great had of the people, the dissensions of the nobles would perhaps h have brought ruin to France, if skilfully handled artillery had not come to give the royal power new force, and to furnish it with both the means of repulsing the enemies of France and of destroying the castles of those feudal lords, that had no country.

This period of history marks a new era. The English had been vanquished by fire arms, and the king had reconquered his throne by plebian hands, and saw himself for the first time at the head of forces, that belonged to him alone. Charles VII,

artillerie, by L. Napoleon Bonaparte, president of the republic. Vol. 2. p. 96.

Note 2. p. 404. Deposition of duke of Alencon. Michelet. H Hist. de la France. Vol. 5. p. 99.

Note 3. p. 404. The casting machines threw stone balls; it was natural to retain the projectile, when the mode of projection was changed.

"This harder ball no longer broke and could penetrate the masonry, it had the advantage of increased velocity by diminishing its size; the mortars became lighter, although their effect was rendered more dangerous.

Instead of erecting forts all around the city, [4] the besiegers established before the great fortresses a park enclosed by an entrenchment located in a central position beyond the range of guns. From this point they led one or two trenches to the points where their batteries were placed. [5] We have come to the time when trenches were employed as a means of approach at the same time as protections of timbers. To the brothers Bureau belongs the honor of having been first to make the most judicious use of artillery in sieges. So that the obstacles fell before them, the walls when struck no longer resisted their balls and broke in fragments. The cities defended by the English, and that they had taken entire months to besiege in their invasion, were taken in a few weeks. They sp spent four months in besieging Harfleur in 1440; eight months in besieging Rouen; ten months in obtaining possession of Cherbourg in 1418, while in 1450 the entire conquest of Normandy, that required the undertaking of 60 sieges, was completed by Charles V in one year and six days." [1]

Note 4. p. 404. See the siege of Orleans in 1428. We shall return to the works executed by the English to fight and blockade this city.

Note 5. p. 404. At the siege of Caen in 1450; "Then after they began at the side of the constable to make covered and uncovered approaches, of which Bourgeois led one and Jacques de Chalonne the other; that of Bourgeois was first at the wall, and then the other arrived, and the wall was mined at that p place. So the city would have been taken by assault, if the king had not wished this, and did not desire to place mortars at that side, for fear that the Bretons might attack. Hist.de

In 1359 was organized at Paris the guild of crossbow men to the number of 200; by an order dated Nov. 6, 1373, Charles V fixed this at 800. These crossbow men who belonged to the citizen class, and did not follow the profession of arms, could not leave their guild to serve in the army or elsewhere, without authorization of the provost of paris and of the provost of the merchants. When these magistrates sent these crossbow men to serve outside the suburbs of Paris, men and horses (f (for there were crossbow men on horses and on foot) were fed; each man further received three sous daily, their constable a also having five sous daily; all at the cost of the city.

By letters patent of June 12, 1411, Charles V ordered that a guild of archers, composed of 120 men, should be established at Paris; that these 120 archers should be chosen among the archers already existing; that this guild should be particularly charged with guarding the person of the king and the defense of the city of Paris.

Charles V. by letters patent of April 22, 1448, instituted the free archers to serve in time of war. For the formation of this privileged body were selected strong and celver men in each parish, and among the inhabitants in good circumstances, because these free archers were obliged to equip themselves at their own cost, or otherwise at the expense of the parish. The number of the contingent was nearly one man to fifty fires. (Rech. hist. sur las Corp. des archers, des arb. et des arque., by Victor Fougue. Paris. 1852.).

Note 2. p. 403. The English army had cannon at the battle of Crecy. From 1326 the city of Florence had cannon made of iron and metal. (Bibl. de l'ecole des chartes. Vol. 6. p. 50). In 1339 two knights, de Cardilhac and de Bieule received from the master of the crossbow men of the city of Cambrai "10 cannon, 5 of iron and 5 of metal"(probably of wrought iron and of cast metal), "which were given by order of said master of the crossbow men by our hands and our men, and which are in the guard and the defense of the city of Cambray." Original parchment among the title deeds of Clairambault. Vol. 25 p. 1825. Liby. of ecole des chartes. Vol. 6, p. 51. "For salpetre and sulphur etc. bought for the guns at Cambray, 11 livres, 4 sous, 3 deniers tournois." See Art. of M. Lacabosse, same volume, p.28.

Note 1. p. 404. Etude sur le passe et l'avenir de l'artill-

were accustomed to war; better disciplined and armed, they a already presented at the end of the 14 th century teoops sufficiently stable, that to them could be entrusted the guard of important posts.[1] Toward the middle of that century had already been employed cannon, either in regular battle or in sieges.[2] This new means of destruction must change, and did soon change all conditions of attack and defense of places. Of little importance still at the beginning of the 15 th century, artillery took a great development toward the middle of that century. "In France," says the illustrious author already cited; "1, the war of independence against the English had a aroused the warlike genius of the nation, and not only the he heroic Joan of Arc occupied herself in directing the artillery;[2] but two eminent men arose from the people, the brothers Bureau, and devoted all their care to perfecting cannon and the conduct of sieges. They commenced to employ, although in small number, balls of iron instead of those of stone,[2] and then a projectile of equal weight occupying a much smaller v volume, greater velocity could be given to it, because the gun being of less calibre, offered more resistance to the explosion of the powder.

Note 1. p. 408. particularly during the 14 th century was organized in a regular manner the guilds of crossbow men and of archers in the cities of the North. By an order dated in August, 1867, Charles V instituted a company of crossbow men in the city of Laon. The king named for three years Michauld de Laval constable of that company. "Afterwards," says Art.1 of that decree, "the crossbow men will elect every three years a constable by plurality of voices. Michauld de Laval, with the advice of five or six of those most expert in the use of the crossbow, will choose the 25 crossbow men, that will form the company. The crossbow men will obey the constable in all concerning their duties, under pain of a fine of six sous."

Art. 2 states:-- "The king retains these crossbow men in h his service, and places them under his safeguard." Then follow Articles establishing certain privileges in favor of the company, such as exemption from all imposts and taxes, excepting "the assistance established for the ransom of king John."

The same king instituted a company of 20 crossbow men at C Compeigne.

by throwing a great number of brave and well armed soldiers, furnished with fascines and ladders, on one point, supporting them by numerous covered crossbow men and archers, forming a column of attack with devoted men, and lost few men by acting with vigor and rapidity. At the siege of Gingamp:-- (See old French poem in Note).

Du Guesclin did not employ movable towers, those slow, costly and difficult means of attack; he scarcely used offensive machines; he employed mining and undermining, always with that activity, promptness and abundance of resources, with that c care in details, that characterize great captains. He invested the keep Meulon:-- (See old French poem in Note).

Feudalism from the end of the 14 th century had played out its part in war as in politics. Its prestige was destroyed, and Charles VII and Louis XI had actual regular armies.

If we have extended this matter, it is because it has seemed necessary to exhibit the transformations through which the art of war must pass, so as to render an account of the different systems of defense successively adopted from the 10 th to the 16 th centuries. There is no need to demonstrate what is imperative in the art of fortification; here all should be sacrificed to the need of defense, and yet such was the power of feudal tradition, that forms were long employed and till the end of the 16 th century, whose arrangement was retained, while they were found nowise equal to the new means of attack. Especially to the fortifications of castles is this remark a applicable. Feudalism could not resolve to replace its high towers by low and extended works; for the great keep the thick stone and well closed wall was always the mark of power and of rule. So the castle abruptly passed in the 16 th century f from a mediaeval fortification to a country seat. (Art. Chateau).

It is not the same for the cities; because of its disasters, the French militia gradually lost its ascendancy. Undisciplined, always placing feudal above national interests, during the wars of the 14 th and 15 th centuries it played the part of partisans, surprising castles and cities, pillaging and b burning them, losing them next day; sometimes adhering to one party, sometimes to another, according to its interest for t the moment. But the guilds of the good cities, who did not k know how to fight in the epoch of the conquest by Edward III,

that he ransomed himself at 80,000 crowns by weight. And still the said brigands held the said castle and equipped it well, and made war on the county. Then for his prowess, the king of france desired to have him with himself, and bought his castle for 80,000 crowns; and he was doorkeeper at arms of the king of France, and had great honor with the king. And this brigand was named Bacon. And he always rode good horses and great palfreys, and so he was well armed as a count, clothed very richly, and remained in this good state as long as he lived." [1] Here the king of France treated with a soldier of fortune, gave him a superior position, and attached him to his person; the king here made a great step for the defense of the country ; he s sought defenders of the soil outside feudalism among the chiefs, that rose from the people. With these companies, these soldiers without a country but brave and accustomed to the trade of arms, with these tramps with neither law nor faith, that du Guesclin was to conquer one by one all the strong places, that fallen into the hands of the English. Misfortunes and despair had roused the people, and the peasants themselves took to the country and attacked the castles.

Note 1. p. 400. Froissart. chap. 324. Edition Buchon.

To conquer a part of the French provinces, the English had only to contend with the feudal nobility; after having taken their castles and domains and finding no people under arms, they only left in their strong places isolated and small garrisons, some men in armor supported by a small number of archers, the English thought that the French feudal nobility without an army could not retake its castles, in spite of its bravery. great was also the surprise of the English captains a after some years, whey they not only found themselves attacked by a brilliant chivalry, but also by intrepid troops, disciplined in battle, blindly obeying the voice of their chief, having faith in his courage and his star, fighting with coolness and possessing the persistence, patience and experience of old soldiers. [1]

Note 1. p. 401. No strong place resisted du Guesclin, he k knew how to inspire his soldiers, and took almost all cities and castles by sharp attacks. He understood that the fortifications of his time could not resist an attack led without h hesitation, with vigor and quickness. He delivered the assault

excellent militia followed by rascals, servants and brigands, forming rather an embarrassing corps than reliable infantry. The king tried to fill this lack by Genoese crossbow men, Flemings, and the guilds of the good cities. The former, like all mercenaries, were more disposed to pillage than to fight for a cause foreign to them; the troops furnished by the great communes were turbulent and little inclined to leave their homes, owing only temporary service, and profited by the first repulse to return to their cities, abandoning the national c cause, which did not exist in their eyes by reason of the feudal distribution. With these bad elements kings Philip of Valois and John must struggle against English and Gascon armies already organized, compact, disciplined and regularly paid. They were beaten as they should be. The unfortunate provinces of the North and West were ravaged by war, burnt and pillaged, soon reduced to despair; men who had trembled before iron armor, when that armor seemed invincible, saw the flower of the French nobility destroyed by English archers and Welshmen with knives, by mere infantry, and they took arms in their turn; t that remained for them! And they formed terrible companies of robbers. These troops of brigand soldiers, disbanded, left to themselves after defeats, attacked cities and castles:-- "And always collected poor brigands," says Froissart," to conquer and pillage cities and castles, and they conquered so much, that it was marvellous, sent out spies very often to a good city or a good castle, a day or two distant; and then assembled twenty or thirty brigands, and marched both day and nigh t by covered ways, so that they entered that city or castle that the spy had seen, just at the break of day, and set fire to one or two houses. And those in the city thought that a thousand men in armor wished to burn their city; so they feld as best they could, and these brigands broke open houses, coffers and caskets, took what they found, then went on their way loaded with booty. Among others, a brigand in Languedoc, who had in such manner seen and spied on the strong castle of Gombourne in Limousin, in a very strong place indeed. So there came at night thirty of his companions to that strong castle, scaled and took it, and captured there the lord within, who is called count of Gombourne, slew all the men in it, and put t the lord in prison in his own castle, and held him so long,

would call together your council and he will send his own, by their advice to find a place where to fight, and this we are charged to say and to request of you."

Note 1. p. 398. Against their attacks.

Note 2. p. 398. Froissart. Chap. 318. Edition Buchon.

A letter from the king of England to the archbishop of York shows that this prince accepted the singular proposal of king Philip, [3] but after parleys, during which the besieging army continued to fortify itself further in its camp and to guard the passages, the king of the French suddenly retreated and disbanded his men on Aug. 2, 1347.

Note 3. p. 398. The story of Froissart does not agree with the letter of the king, for according to the chronicler, king Edward referred the challenge of Philip. Stating that he had only to come and find him in his camp.

What precedes shows that already the military spirit was m modified in the West, and in the new way the Anglo-Normans had preceded us. At each instant in the 14 th century the ancient knightly spirit of the French clashed with the political spirit of the English, with their national organization already in existence and consequently powerful. The use of gunpowder in armies and sieges struck a new and terrible blow against f feudal chivalry. Individual energy, material force, enthusiastic bravery, must soon yield to calculation, to the foresight and intelligence of a captain, seconded by troops accustomed to obedience. Bertrand du Guesclin serves as a transition between the knights of the 12 th and the skilful captains of t the 15 th and 16 th centuries. It must be stated that in France the inferiority in war is never of long duration, a nation warlike by instinct is rather instructed by its reverses as well as by its successes. We have mentioned the distrust of French nobility in regard to the lower classes, a mistrust caused by preferring in the armies mercenaries to citizens, who once disbanded, accustomed to arms and to danger, finding themselves a hundred against one, could dare to combine against the feudal system and break it. Royalty restricted by the privileges of its vassals could not directly call the people to arms; to collect an army it convoked the nobles, who on t the call of the sovereign reported themselves with the men, that they were bound to furnish; these men composed an excel-

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and all that came to them daily by sea from England, and also from Flanders, whereby they were comfoeted by provisions and goods. With all that the men of the king of England often overran the country in the county of Guines, in Therouenois, a and even to the gates of S. Omer and of Boulogne; thus captured and brought to their host a great harvest of booty, by w which they were refreshed and fed. And yet the king did not cause his men to attack the said city of Calais, for he knew well that he would lose his trouble and would labor in vain. So he spared his men and his artillery, and said that he would starve them, however long it should take, if king Philip of F France did not come again to fight and raise the siege." But king Philip arrived before calais at the head of a fine army, and at once the king of England caused to be guarded the two sole routes by which the French could attack him, one of these ways being by the dunes along the shore of the sea; the king of England caused "all his ships and vessels to be drawn up beside the dunes, to be well equipped and supplied with mortars, crossbow men, archers and slingers, and with such things, by which the host of the French neither could nor dared to p pass." The other was the bridge of Neuilly: "and caused his cousin the count of Derby to go and lodge on the said bridge of Neuilly with a great number of men at arms and of archers, so that the French could not pass there, unless they crossed among the swamps, that are impossible to pass. Between the h hill of Songattes and the sea on the other side before Calais was a high tower, that 32 English archers guarded; and they held there the passage of the dunes against the French; and they had strongly fortified it against their attacks by great double moats." The men of Tournay attacked the tower and took it while losing many men; but the marshals came to tell king Philip , that he could not pass without sacrificing a part of his army. Then the king of the French decided to send a message to the king of England:-- "Sire," said the envoys, "the king of France sends us to you to inform you that he has come here, and has stopped on Mount Sagattes to fight you; but he can neither see nor find a way by which he can come to you; so he has a great desire to raise the siege of his good city of Calais. He has asked his marshals to see how he can come to you; but this is impossible. So he freely desires that you

Note 2. p. 396. See Etude sur le passe et l'Avenir de l'artillerie , by prince Napoleon Louis Bonaparte. Vol. 1. p. 16 et seq.

Note 3. p. 396. At Crecy.

Note 4. p. 396. Son of Philip of Valois, king John, taken at Poitiers.

Note 5. p. 396. The course of the statement indicates that these were towers.

Note 6. p. 396. According to the project.

Note 1. p. 397. A machine with counterpoise suitable for c casting great stones.

Note 2. p. 397. Froissart. Chap. 262. Edition of Buchon.

Note 3. p. 397. Of thatch.

Not with that rash lack of foresight proceeded the king of England; he landed at Hogue at the head of a small army, though disciplined; he marched across Normandy always taking care to flank the main body of his army by two bodies of light troops commanded by captains knowing the ground, who covered t the country at right and left, and that came to camp around h him at night. His fleet followed the coast parallel to his a army on land, so as to arrange a retreat for him in case of repulse; after taking each capture he sent to his vessels the products of the pillage of the cities. He reached the gates of Paris and continued his victorious march into Picardy; there he finally met the army of the king of France, defeated it at Crecy, and presented himself before Calais. "When the king of England had first come before the city of Calais, as he much desired to conquer it, he besieged it in a grand manner and with a good arrangement, and caused to be built and arranged mansions and houses between the city and the river and the bridge of Neuilly, using great boards and covering t the said houses witt thatch and broom, that were arranged w well and artfully in streets, as if he must live there ten or twelve years; for such was his intention to not leave in winter or summer until he had conquered it, whatever time or trouble must be taken. And in that new city of the king were all things necessary for a host, and yet more a place arranged f for holding a market on Wednesdays and Saturdays; and there were mercers, butchers, halls for cloth and bread and all other necessities; and men received all easily for their money;

in the name of God and S. Denis. These were the Genoese cross-bow men, about 15,000, who were also weary when the battle began then; for they were greatly tired by our having marched afoot more than six leagues that day, fully armed and carrying their crossbows; and they said then to their officers, that they were not then in good condition to do anything great in battle, these words came to the count of Alencon, who was greatly angered and said:-- One does well to employ such rascals, who fail him at need.

When the Genoese were arrayed together and they must approach their enemies, they began to shout so loudly that it was marvellous, and did this to frighten the English, but the English stood quietly, none doing anything. Again they shouted and moved a step forward; but the English were quiet without moving a step. A third time they shouted very loudly and clearly, and moved forward, holding their crossbows and beginning to shoot. And those English archers, when they saw this array, moved one step forward, then beginning to shoot arrows in such fashion, that they rose and fell so uniformly on the Genoese that they seemed like snow. The Genoese had not learned to meet s such archers as those of England, and when they felt the arrows pierce their arms, heads and faces, they were at once defeated; some cut the strings of their crossbows and others t threw them down; thus they began to retreat.

Between them and the French was a great body of men at arms, mounted and very finely equipped, who saw the act of the Genoese; so that when they would retreat, they could not, for t the king of France, when he saw their poor array and that they were thus defeated, ordered:-- Now at once kill all those rascals, for they stop our way without reason. Then came the men at arms among them all to strike and slay them, and some were slain among them, who never rose. And always the English shot into the great crowd, so that no arrows missed; for they did such great harm to the bodies of men and horses, that they w were overthrown and could not be raised, except by force and great assistance from the men. Thus commenced the battle between Broye and Crecy in Ponthieu on Saturday at the hour of vespers." (Froissart. Bataille de Crecy. Chap. 287).

Note 1. p. 396. Called brigands because they wore a coat of mail called brigantine.

built, to fight against the four towers aforesaid. These four machines cast such great stones so frequently against the towers, that they were soon wrecked, and the men at arms and those who guided them could not protect themselves within them. So they tried to retreat, as they were beyond the river, one was overturned in the deep water, and most of those within w were drowned, which was a pity and damage; for these men were good knights and squires, who had a great desire to advance to acquire honor."[2] The duke of Normandy had sworn to take A Aguillon, nobody in his camp dared to speak of leaving, but the counts of Gines and of Tancarville went to seek the king at Paris. "So they stated to him the manner and state of the siege of Aiguillon, and how his son the duke had assailed it in several assaults and conquered nothing. The king was entirely amazed, and sent no order to the duke his son; but indeed wished him to still remain before Aiguillon, until it should be constrained and conquered by famine, since it could not be taken by assault."

Note 2. p. 324. "There is no man, unless he were present on that day, would neither have good leisure to describe or imagine the truth, especially on the part of the French, so bad were their array and arrangement of their troops; what I knew I have learned chiefly from the English, who well understood their arrangement, and also from the people of John of Hainault, who was always near the king of France. The English were placed in three divisions and were seated on the ground; as soon as they saw the French approach, they rose up in good order without fear and arranged their divisions, that of the prince being entirely first, his archers formed like a portcullis (in open lines so as not to hit each other in shooting), men at arms in the rear of the division. The count of Northampton and the count of Arundel and their division were second, were at the wing in good order, ready to help the prince if n necessary. You must know that these lords, kings, dukes, counts and French barons, did not come there together, but one before and another behind without order. When king Philip came near the place, where the English were arranged and ordered, and he saw them, his blood boiled, for he hated them; and he did not then refrain from fighting them, saying to his marshals:-- order our Genoese forward and commence the battle in

captain, succeeded in better directing the bravery of his knights. These transformations in the composition of armies and the use of cannon necessarily modified the art of fortification, slowly it is true, for feudalism yielded with difficulty to the innovations in the art of war; it was necessary for a long and cruel experience to teach them at their cost, that bravery alone does not suffice to win battles or to take places; that the strong and high walls of its castles were not impregnable to an enemy proceeding with system, careing for its men and taking time to construct its works of approach. The war of a siege during the reign of Philip of Valois is no less interesting to study than war in the field, the organization and the discipline of English troops gave them an incontestable superiority over French troops in both wars. At a d distance of some months, the French army under the orders of the duke of Normandy,[4] laid siege to the place Aguillon situated at the junction of the Lot and Garonne, and the English besieged Calais. The numerous French army, that Froissart estimated at nearly 100,000 men, composed of the flower of chivalry, after numerous assaults, acts of unheard bravery, could not subdue the fortress; the duke of Normandy having already lost many man, decided to make a regular siege:-- "The morrow of the fruitless attack on the bridge of the castle, two master engineers came to the duke of Normandy and the lords of his council, and said that if they were believed, and timber and workmen were supplied in abundance, they would build four great towers,[5] strong and high on four great strong sheds, and that they would take them up to the walls of the castle, and they should be high enough to rise above the walls of the castle. The duke voluntarily listened to these words, and he ordered that the four towers should be built, whatever they must cost, and that all the carpenters in the county should be set to work, and that they should be paid liberally by the daybecause they would work more freely and more skilfully. These four towers were built according to the plan[6] and direction of the two masters, on four strong sheds; but they took a long time and cost much money. When they were completed and the men entered them, who were to fight those of the castle, and they had passed the half of the river, those of the castle fired four stone-throwers,[1] that they had recently

I are lodgings and stables. (See Israil Sylvestre's Vues des Maisons royales et Villes. We have taken from the plan given by Sylvestre only the structures before the 16 th century; t there must have existed many others in the 14 th 14 th and 15 th centuries, but we know neither their places nor their form).

Note 1. p. 384. The end of the parallelegrom of the enclosure comprising the towers is 6601.4 ft.

The feudal system was essentially suitable for the defense and the attack of places; for the defense in that the nobles and their men constantly lived in fortresses, that protected their lives and property, and thought only of improving and making them more formidable daily, so as to be able to defy the ambition of their neighbors or to impose conditions on their sovereign. For the attack, in that to get possession o of a fortress then, it was necessary to fight hand to hand d daily, consequently to arrange excellent troops, brave, and that vigor and boldness made superior to the number of assailants, or the wise combinations of the attack. The improvements in the art of defending and of attacking strong places was already very developed in France, when the art of war in the f field remained stationary. France possessed excellent troops composed of men accustomed to arms from infancy, brave to rashness, and it had no armies: her infantry was only composed of mercenaries, Genoese, Brabantins and Germans, and of irregular troops from the good cities, badly armed, with no idea of manoeuvers, undisciplined and more embarrassing than useful in action. These troops disbanded at the first check, cast t themselves on the reserves, and brought disorder into the squadrons of the constabulary. [2] The passage of Froissart that we give in its entirety in a note, shows what a Frencr army was during the first half of the 14 th century, and how little regard the nobility paid to these troops of brigands, [1] of G Genoese crossbow men, and finally of the infantry. The English commenced at that epoch to place in line a numerous infantry, disciplined, exercised in drawing the bow, [2] already using f fire arms, [3] The superiority of the knights, incontestable until then, was in its decline; the French constabulary in the open country only fell from one defeat into another up to the moment when du Guesclin organized companies of hardened and disciplined infantry, and by the ascendant of his merit as a

towers constructed at the end of the 15 th century. The Normans and the poitevins, until the moment of the reunion of these provinces with the royal domain, i.e., until the beginning of the 13 th century, appear to have adopted by preference the square form in the construction of their towers and keeps. M most of the old castles built by the Normans in England and in Sicily present rectangular defenses. (Arts. Tour, Donjon).

Note 1. p. 391. Scaling by means of ladders.

The art of fortification had made a great advance at the b beginning of the 13 th century, and had remained almost stationary during the course of that century, made new progress in France during the wars from 1330 to 1400. When Charles V had brought order into the kingdom, and retaken a considerable number of places from the English, he caused the repair or rebuilding of nearly all the defenses of the reconquered cities or castles, and in these new defenses it is easy to recognize a method and a regularity that indicate an advanced art based on fixed rules. The castle of Vincennes is an example of this (41).[1] Built on a plain, it could not there frofit by certain particular arrangements of the site; thus its enclosure is p perfectly regular, as well as the keep and its defenses. All towers are rectangular or square, but are high, thick, and w well equipped at their tops with projecting turrets flanking the four faces; the keep is likewise flanked at the angles by four round towers, the distances between the towers are equal; they are closed and can defend themselves separately. [1] The c castle of Vincennes was commenced by Philip of Valois and finished by Charles V, except the chapel, that was only completed under Francis I and Henry II.

Note 1. p. 392. We give here the plan of the castle of Vincennes, because one can regard this fortress rather as a great place of arms, a fortified enclosure, than as a castle in the old sense of the word. We shall further return to it under t the Articles Chateau and Donjon. At E are the sole entrances of the enclosure, which were defended by advanced w rks and rectangular towers, at A is the keep surrounded by a separate enclosing wall B. A very wide walled moat protects that keep. At K are the moats of the enclosure, whose counterscarp is also walled and has always been so. F is the chapel and G is t the treasury; D is the bridge giving access to the keep, H and

minimum given to good defenses to protect them from scaling.[1] But om the other hand, if the enclosure of Avignon was only a defense of the second or third order, the castle or residence of the Popes during the 14 th century, it was a formidable citadel able to sustain a long siege by its site, its extent and the height of its towers. There again the towers are square, but with a thickness and a height, that they could defy undermining and projectiles cast by machines then in use; they were crowned by parapets and machicolations of stone on corbels. As for the machicolations of the walls, they are composed of a series of pointed arches leaving between them and the external face an empty space suitable for dropping stones or o other projectiles. In the provinces of the South and West this sort of machicolations were greatly in use in the 14 th century, and they were preferable to the machicolations of wooden galleries or stone parapets set on corbels, because they were continuous, neither interrupted by joinst or corbels, and that they permitted thus dropping along the wall on the assailants long and heavy timbers, that falling across them, infallibly broke the cats and shields, beneath which were the pioneers.

Note 1. p. 384. At Carcassonne on the South side the ramparts of the second enclosure were equipped with these wooden works in time of war, their traces are perfectly preserved from gate Narbonne to the corner tower at the West. (Fig.11).

Note 1. p. 386. Vignette accompanying Chapter 125, entitled:-- "How king David of Scotland (David Bruce of Scotland) came w with a great host before the new castle at Thin."

Note 1. p. 390. We have before seen that the ramparts of A Aigues-Morts are likewise flanked on one front by square towers, and we should not forget that they were erected by the Genoese Boccanegra. Yet the enclosure of Paris, rebuilt under Charles V, was also flanked by rectangular towers, but the w walls of Paris never passed for being very strong. Square towers belong rather to the South than the North of France, the ramparts of Cahors date from the 12 th, 13 th and 14 th centuries and present square towers with a beautiful definsive o arrangement; the ramparts of the cities of the county of Venaissin are generally furnished with square towers, that date from the 14 th century. Thus most of the cities of Provence on the banks of the Rhone and Orange were furnished with square

and at I is the last uncovered battlement at the base of the roof; at K is the stairway tower serving the watch at its top. But particularly in castles, because of the small space reserved within their enclosures, the curtains became eave walls of buildings arranged between the towers along these enclosures, so that the passage gave access into the halls, which replace the shed roof L, indicated in Fig. 33. (Arts. Chateau, Chemin de Ronde). Here is the restoration (37) of this part of the defenses of Pierrefonds. There will be easily understood the purpose of each detail of the military construction just described. But these were the strongest defenses of towers and walls, and many were inferior to them in arrangement, being composed only of battlements and macricolations of small projection with a narrow passage. Such are the walls of Avignon, that in their preservation are certainly the most beautiful on the actual soil of France, but that in strength do not present a formidable defense for that epoch in which they were erected. According to the method then in use in Italy, the w walls of Avignon are flanked by towers, that are square with some exceptions. [1] In France the round tower had justly been recognized as stronger than the square tower; for as we have already demonstrated, the pioneer at the base of the round t tower could be struck obliquely from the adjacent curtains, while if he reached the base of the outer face of a square tower at O, he was completely sheltered from the nearest defenses (38); and by preventing the defenders from ascending the battlements by destroying some machicolations perpendicularly over him, he could undermine in entire safety. Contrary to the methods accepted in French fortification of the 13 th and 14 th centuries, the square towers of the ramparts of Avignon are open at the side next the city (39), and consequently could not be held from the moment that the enemy had enteret the city. The walls of Avignon are scarcely more than a f flanked enclosure, as were the external enclosures of cities furnished with double walls, and not with curtains interrupted by forts able to hold out against an enemy when master of the place. These walls are not even equipped with machicolations in their entire extent, and the side at the South of the city is defended only by simple battlements not intended to receive wooden galleries. Their height does not attain the m

men proceeded for curtains that they endeavored to fortify well (33). Stone corbels made of stones set on each other and spaced about 2.3 to 4.7 ft. on centres. On the ends of these corbels was erected a wall 1.1 to 1.3 ft. thick with openings and 2.6 ft. high. To prevent overturning the corbels at C, a wall was built with doorways and square openings high enough to g give the covering D the proper inclination. Behind the wall C was erected a wooden porch L, that replaced the passages E of the wooden galleries (32), and that was necessary for supplying the parapets and for passage without interfering with the crossbow men or the archers posted in G. Better still was that for the towers.(34). Arranging the story G of the machicolations like that of the curtains, the wall C was extended in a story pierced by windows or slots, and even sometimes on the slope of the roof at I was also arranged a covered way w with battlements. Thus if the passage G were taken by scaling or by means of movable towers after the destruction of the p parapet B, by barricading the doors K one could still overthrow the assailant, that succeeded in placing himself in G on a space without outlets, by casting stones, beams and other projectiles through the openings of the stories H and I. Froissart's manuscript in the Imperial Library, that we have already cited, gives in its vignettes a great number of towers arranged in that manner. (35). [1] Many of these figures show that with the stone machicolations were retained wooden galleries A for the defense of the curtains; and indeed these two defenses were long employed together, the passages and wooden galleries being much less expensive to erect that stone machicolations.(Art. Machicoulis). The castle of Pierrefonds, built during the last years of the 14 th century, presents again in a very complete manner these kinds of upper defenses. Here ((36) is the actual state of the angle formed by the northeast tower and the north curtain. There is seen perfectly at A the machicolations still in place, at B the removal of the stone parapet, at C the band of the shed roof that covered the passage D, at E the stone corbels that supported the crest of t that shed roof, at G the doors giving entrance to the stairway of the passage, and at F the openings permitting the passing from inside the tower projectiles to the defenders of the battlements, at H is a covered battlement story over the machines,

well armed."

We have seen how during the 12 th and 13 th centuries, it was a custom to equip the tops of towers and of curtains with wooden galleries. It is unnecessary to say that the assailants, by means of casting machenes, sought to destroy these galleries with stones, or to burn them with flaming projectiles, w which was easily done if the walls were not very high or if the galleries were not covered by fresh hides. Already about the middle of the 13 th century it was sought to render carpentry galleries less easily burned by placing them on corbels formed by projecting stones. Thus were supported at Coucy the galleries over the gates of the city, of the towers anf the keep, which date from that epoch. (Art. Hourd). But still the surfaces and the floors of these galleries could not take fire. In the 14 th century during the wars of that epoch in which so many cities in France were burned and pillaged, "burnt and robbed," as Froissart says, almost everywhere the galleries in carpentry were replaced by continuous stone passages, that present all the advantages of galleries, since they command the foot of the walls without their inconveniences; these new crowning passages could not be burnt and better resisted the projectiles cast by the machines; they were permanent and were not merely placed in time of war like the wooden galleries. But to offer a wide passage to the defenders and a projection from the face of the wall, that permitted the opening of the machicolations of good dimensions, it was soon necessary to modify the entire system of construction of the upper part of the defenses. By means op wooden galleries were added to the passage A in permanent masonry a gallery B pierced by holes at C and slots at D, but the width of these passages was again enlarged, either by extending the galleries inside the city as at E, or by adding thereto wooden floors F with joists extending into holes formed beneath the top slab and supported by posts G. These defensive additions were usually reserved for curtains that appeared weak, and that were easily approached. [1] The galleries have the advantage of allowing the stone parapet H to remain and of retaining still a defense behind them, when the galleries were crushed or burned. It was difficult to obtain with stone passages and machicolations the large spaces and divisions useful for the defense; here is how

rising the floor closed the entrance to the passage (as it s still does in our fortresses). But during the 12 th, 13 th and 14 th centuries were employed other kinds of hinged shutters; there was the swing gate, particularly adapted to posterns, that swung on a horizontal axis at its top and fell against the heels of those going out (29). Gates of barriers that swung on horizontal axes placed about the middle of their height (30), one half serving as a counterpoise for the other. In t the beautiful manuscript of the Chronicles of Froissart in t the Imperial Library [1] is found a vignette representing the attack on the barriers of the city of Aubenton by the count of Hainault, and the gate of the barrier is arranged in this manner (31); it is equipped and defended by two wooden towers. Behind it may be seen the gate of the city, which is a stone structure, although the text states that the city of Aubenton "was only enclosed by a palisade." Soldiers cast down from the battlements a bench, pots and furniture.

Note 1. p. 380. Entrance of the castle of Montargis from t the side of the road from Paris to Orleans. (Du Cerceau, Chateaux royaux de France).

Note 1. p. 382. Manuscript 8320. Vol. 1. in folio, beginning of the 15 th century. This vignette, a part of which we give, accompanies Chapter 46 of this manuscript, entiteld:-- "Comment le comte de Haynault print et detruit Aubenton en terasse." It is Chapter 102 of the edition of the Chronicles of Froissart of the Pantheon litteraire." So began the great and very severe assault, and the crossbow men within and without were engaged in shooting very vigorously; by which many of the assailants and defenders were wounded. The count of Haynault and his men, with whom we may expect knights and squires, even c came to the barriers of one of the gates. There was a great and hard attack. On the bridge there, at the gate toward Chimay, were Jean de Beaumont and Jean de la Bove. There was a great and severe skirmish, and the French were compelled to retreat into the gate; for they lost their barriers, the Hainaulters conquering them and the bridge also. There was a strong skirmish and a laborious attack, for those within and above the gate cast timbers and planks on them, with pots full of lime and a great number of stones and pebbles, by which they would have wounded and half covered the men, if they had not been

necessary that the corner towers, as they were then generally termed, should be very strong in themselves. They were built with a greater circumference than the others, were made higher, and obstacles at their external bases were multiplied by wider moats, palisades, sometimes even by advanced works, they were equipped with projecting angles, they were isolated from the adjacent curtains, and care was taken to properly fortify the two towers next them, [1] and sometimes to connect these towers by a second internal rampart (26 bis). [2] Besides men avoided as much as possible these projecting angles in well fortified places, and when they existed, they were imposed by the form of the ground to dominate a steep slope, to command a road or a river, and to prevent the enemy from establishing himself at the level of the base of the ramparts.

1.The plan given here is that of the West angle of the double enclosure of the city of Carcassonne, built by Philip the Bold.

Note 2. p. 379. This projecting angle (26 bis), that clearly presents the arrangement mentioned here, is one of the defenses from the 13 th century at the castle of Falaise. (Art. Chateau).

Until the 14 th century the gates were equipped by good double leaves, portoullises, machicolations, towers of two or t three stories, but they did not possess drawbridges. In the castles movable wooden bridges, that could be removed in case of a siege, often completely interrupted communication with the exterior; but in the enclosures of cities palisade barriers or barbicans defended the approaches; further, once the barrier was taken, men usually entered the city at the level of the ground. It was hardly at the beginning of the 14 th century, that men commenced to establish bridges thrown over the moat before the gates, wooden lift bridges at the barriers (27), or at advanced works in masonry (28). Then soon at about the middle of the 14 th century, the lift bridge was p placed at the gates themselves, as may be seen at the foot of Vincennes, among other examples. (Art. Pont-Levis). Yet we must state that in many cases,even during the 14 th and 15 th centuries, lift bridges were only attached to advanced works. These lift bridges were arranged like those generally employed today, i.e., were composed of a carpentry floor rotating on an axis by means of two chains, levers and a counterpoise; by

Villeneuve-le-Roi, they have the form of rectangles set diagonally so as to obliquely cover the entrance and the two adjacent curtains. Men therefore had recognized from the 13 th century the inconvenience of round towers, their weakness at the tangend point parallel to the curtains (Art. Porte). The use of these means seems to have been reserved for places very strongly defended, such as Carcassonne, Loches, etc., for sometimes at the end of the 13 th century in places of the second order, men were content with slightly projecting square towers to defend the curtains, as one may still see on one of the f fronst of the enclosure of Aigues-Morts (25), whose ramparts (except the Constance tower built by S. Louis, and that served as a keep and lighthouse) were erected by Philip the Bold.[1]

Note 1. p. 378. "Philip the Bold left Paris in the month of February 1272 at the head of a numerous army to go to take p possession of the county of Toulouse, and to punish on the way the revolt of Roger Bernard, count of Foix, and stopped at M Marmande. There in the month of May he signed an agreement w with William Boccanegra, who had joined him in that city, by which the latter engaged himself to devote 5000 livres tournois ($17,700) to the construction of the ramparts of Aigues=Morts, for which the king gave to him and his descendants under the title of a fief, one half the domainal rights to which the city and pose were subject. The letters patent issued for that purpose were countersigned by the great officials of the crown, to render them more authentic. At the same time and to contribute to the same expenses, Philip ordered that there s should be levied besides the denier per livre already established, one-fortieth on all the merchandize entering Aigues-Morts by land or sea." (Hist. gen. du Languedoc. Reg. 30 du tresor des chartes. No. 441. Hist. d'Aigues-Morts, by F. Em. di Pietro. 1849).

But at the projecting angles of plans was especially recognized the necessity for arranging defenses of great value. As still today, the assailant regarded a projecting angle as more easy of access than a franked front. Casting machines not having a great range until the moment of the use of cannon, the projecting angles only protected by distant defenses were weak (26); and when the assailant was able to reach A, he was completely sheltered from the near defenses. Then it was nec-

campaigning, after which each man returned to his home, when the sovereign could not obtain his mercenary troops. In this respect from the end of the 13 th century the English monarchy had acquired a great superiority over the French monarchy. A Anglo-Norman feudalism composed a more united body than French feudalism; it had proved this in compelling the grant of the great charter, and by the result of that accord was intimately connected with the sovereign. That form of government was relatively liberal, and had brought the English artistocracy to introduce into its armies bodies of infantry raised in the c cities, who were already disciplined, skilful in drawing the bow, and who determined the winning of nearly all the disastrous battles of the 14 th century, Crecy, Poitiers, etc. The same feeling of mistrust, that caused the French feudal noble to isolate his castle from the city placed under its protection, did not allow him to supply arms to the citizens, or to familiarize them with military exercises; he counted on his own man, on the goodness of his horse and his armor, his courage above all, and he despised the foot soldier, that he only employed in the campaign to increase the numbers, also counting him as nothing in the moment of action. This spirit was so fatal to France in the epoch of the wars with the English, and was the cause of the loss of French armies in many battles arranged in the 14 th century, in spite of the incontestable superiority of the feudal police of this country, w was essentially favorable to the development of military architecture, and indeed nowhere in the west does one find more numerous, more complete and more beautiful feudal fortifications in the 13 th and 14 th centuries than in France. (Arts. Chateau, Donjon, Tour, Porte). [1] In the feudal castles especially is it necessary to study the military arrangements; there they developed from the 12 th to the 14 th centuries with a luxury of precaution and an extraordinary power of means.

Note 1. p. 272. The number of castles that covered the soil of France is incalculable, particularly on the frontiers of the provinces. There was scarcely a village, market town or little city, that did not possess at least one, without counting the isolated castles, posts and towers, that were found at distances along the course of the rivers, in the valleys serving as passages and in the n[illegible]. From the first times

be annexed to a city, it is completely independent from that and retainis its character of a feudal castle. Here the city built at C is surrounded by a sufficiently strong enclosure; between it and the castle exists a terrace A, a sort of place of arms, only communicating with the city be the gate E, defended on both sides, but especially against the city. The castle is built on the highest point of the hill, dominates the very steep slopes, and is separated from the place of arms by a wide ditch D. If the city were taken, the place of arcs and then the castle served as assured refuges for the garrison. In the area A were arranged the stables, the refectories and the lodgings of the garrison, while it was not compelled to retire within the encluseres of the castle; posterns pierced in the enclosures of the place allowed sorties to be made or aid to be received from outside, if the enemy held the city, and were not in sufficient number to guard the city and blockade the castle. Many cities present defensive arrangements a analogous to these; Guise, Chateau-Thierry, Chatillon-sur-Seine, Falaise, Meulan, Dieppe, Sauveur, Bourbon l'Archimbaut, Montfort l'Amaury, Montargis, Boussac, Orange, Hyeres, Loches, Chauvigny en poitou, etc. In the last city three castles dominated the city; at the end of the 14 th century, all three being built on an adjacent hill and being independent of each other. Those cities in which the defenses were so divided, p passed with reason for being very strong; frequently armed e enemies after obtaining possession of the fortifications of the city must renounce a siege of the castle, pursuing their conquests without the power of subduing the garrisons, that on the morrow after their departure retook the city and attacked their rear. Certainly if feudalism had been united, no s system was more suitable for arresting the progress of an invasion than this parcelling of the defense, and that explains even the incredible facility with which were then lost the c conquests of a province; for it was impossible to ensure as today the results of a campaign by centralizing the military power and by an absolute discipline. If the conquered country was divided into a number of domains, that each defended itself on its own account rather than to keep the faith sworn to the sovereign, the armies being composed of vassals, that according to feudal law owed only forty or sixty days of campa-

be seen, as we have already stated, that besides the Louvre A other fortified establishments are scattered around the enclosure; H is the castle of Bois surrounded by gardens, a pleasure house of the king. At L is the mansion of the duke of Brittany. At C is the palace of king Robert and the monastery of S. Martin-des-Champs surrounded by a fortified enclosure. At B, the Temple forms a separate citadel with its walls and keep. At G mansion Vauvert built by king Robert, also was s surrounded by an enclosure.

Note 1. p. 368. Hist. de la Civil. en France. Part 2, 1 st lesson.

Note 1. p. 369. At I was the House of S. Lazare. At K the hospital for lepers. At M and N the markets. At O the Grand chatelet (prison), that defended the north entrance to the island; at P the Little chatelet, that guarded the little bridge at the south. At E Notre Dame and the bishop's palace. At D the old palace. At F S. Genevieve and the palace of Clovis on the hill. (Description de Paris, by N. de Fer. 1724. Dissertation archaeologique sur les anciennes enceintes de P Paris, by Bonnardot. 1853.

Later during the captivity of king John, it was necessary to enlarge this enclusure, especially at the right bank, since the city always became larger (19), the Louvre and the Temple finding themselves comprised within the new walls, but the w well defended gates, furnished with barbicans could take the place of detached forts, and at the east side Charles V caused the erection of Bastile S. Antoine, which commanded the suburbs and strengthened the enclosure. The palace of Tournelles R a also reinforced this part of the city, and also the Temple and the Louvre, retaining their enclosures, formed with the Bastile as many internal citadels. We have already stated, that the system of fortification of the middle ages did not lend itself to extended defenses; it lost its power in occupying too great a perimeter, when it was not accompanied by these advanced f fortresses, that divided the forces of the besiegers and prevented approach. We have seen at Carcassonne (Fig. 11) a city of small dimensions well defended by art ban the nature of t the ground; but the castle formed a part of the city, being only its citadel, and has not the character of a feudal castle, while at Coucy, for example (20), although the castle may

of the feudal organization, the nobles, cities, bishops, abbots in many cases must resort to the sovereign authority of the kings of France to forbid the construction of new castles injurious to their interests and "to those of the country." (Les Olim(statutes)). On the other hand, in spite of the defense of his vassals, the king of France by act of the parliament authorized the construction of strong castles, so as to lessen the nearly rival power of his great vassals. (See Lotin text of Note). (Les Olim, edited by Min. of Pub. Inst. Pub. by Philip III. 1279. Vol. 2. p. 147.).

We have already distinguished castles serving for refuge f from citadels, from garrisons of cities relying on the city enclosures, from isolated castles dominating villages, market towns, and from little open cities, or commanding their defenses and only connected therewith by intermediate works. Among these castles were several sorts, some composed of a simple keep surrounded by an enclosure and some lodgings, others comprising vast areas enclosed by strong walls, isolated bastions, with one or more keeps; placed on the roads, they could intercept communications, and thus formed strong places, extensive and of great importance from the military point of view, requiring a numerous army to blockade them, and for taking them the apparatus of a considerable siege and a very long time. The castles or rather the group of castles of Loches and of Chauvigny, that we have already cited, were of this number.[1] As much as possible, men profited by the natural steepness of the ground in locating castles, for thus they found themselves sheltered from war machines, from undermining and mines, the attack only being made at very close quarters, and casting m machines only being able to raise their projectiles to a quite limited height, there was here the advantage in dominating t the assailant, either by the precipice of rock or by structures of great height, reserving for themselves in the internal construction of the towers and curtains the means of fighting the external enemy on the level of the plan of attack. We have seen that the towers of the old Romanesque epoch were solid in the lower part, and that the curtains were terraced. From the beginning of the 12 th century was recognized the inconvenience of this mode of construction, that gave to the besieged only the summits of these towers and curtains for defending

campaigning, after which each man returned to his home, when the sovereign could not obtain his mercenary troops. In this respect from the end of the 13 th century the English monarchy had acquired a great superiority over the French monarchy. A Anglo-Norman feudalism composed a more united body than French feudalism; it had proved this in compelling the grant of the great charter, and by the result of that accord was intimately connected with the sovereign. That form of government was relatively liberal, and had brought the English artistocracy to introduce into its armies bodies of infantry raised in the c cities, who were already disciplined, skilful in drawing the bow, and who determined the winning of nearly all the disastrous battles of the 14 th century, Crecy, Poitiers, etc. The same feeling of mistrust, that caused the French feudal noble to isolate his castle from the city placed under its protection, did not allow him to supply arms to the citizens, or to familiarize them with military exercises; he counted on his own man, on the goodness of his horse and his armor, his courage above all, and he despised the foot soldier, that he only employed in the campaign to increase the numbers, also counting him as nothing in the moment of action. This spirit was so fatal to France in the epoch of the wars with the English, and was the cause of the loss of French armies in many battles arranged in the 14 th century, in spite of the incontestable superiority of the feudal police of this country, w was essentially favorable to the development of military architecture, and indeed nowhere in the west does one find more numerous, more complete and more beautiful feudal fortifications in the 13 th and 14 th centuries than in France. (Arts. Chateau, Donjon, Tour, Porte). [1] In the feudal castles especially is it necessary to study the military arrangements; there they developed from the 12 th to the 14 th centuries with a luxury of precaution and an extraordinary power of means.

Note 1. p. 372. The number of castles that covered the soil of France is incalculable, particularly on the frontiers of the provinces. There was scarcely a village, market town or little city, that did not possess at least one, without counting the isolated castles, posts and towers, that were found at distances along the course of the rivers, in the valleys serving as passages and on the borders. From the first times

be annexed to a city; it is completely independent from that and retainis its character of a feudal castle. Here the city built at C is surrounded by a sufficiently strong enclosure; between it and the castle exists a terrace A, a sort of place of arms, only communicating with the city be the gate E, defended on both sides, but especially against the city. The castle is built on the highest point of the hill, dominates the very steep slopes, and is separated from the place of arms by a wide ditch D. If the city were taken, the place of arcs and then the castle served as assured refuges for the garrison. In the area A were arranged the stables, the refectories and the lodgings of the garrison, while it was not compelled to retire within the encluseres of the castle; posterns pierced in the enclosures of the place allowed sorties to be made or aid to be received from outside, if the enemy held the city, and were not in sufficient number to guard the city and blockade the castle. Many cities present defensive arrangements a analogous to these; Guise, Chateau-Thierry, Chatillon-sur-Seine, Falaise, Meulan, Dieppe, Sauveur, Bourbon l'Archimbaut, Montfort l'Amaury, Montargis, Boussac, Orange, Hyeres, Loches, Chauvigny en Poitou, etc. In the last city three castles dominated the city; at the end of the 14 th century, all three being built on an adjacent hill and being independent of each other. Those cities in which the defenses were so divided, p passed with reason for being very strong; frequently armed e enemies after obtaining possession of the fortifications of the city must renounce a siege of the castle, pursuing their conquests without the power of subduing the garrisons, that on the morrow after their departure retook the city and attacked their rear. Certainly if feudalism had been united, no s system was more suitable for arresting the progress of an invasion than this parcelling of the defense, and that explains even the incredible facility with which were then lost the c conquests of a province; for it was impossible to ensure as today the results of a campaign by centralizing the military power and by an absolute discipline. If the conquered country was divided into a number of domains, that each defended itself on its own account rather than to keep the faith sworn to the sovereign, the armies being composed of vassals, that according to feudal law owed only forty or sixty days of campa-

be seen, as we have already stated, that besides the Louvre A other fortified establishments are scattered around the enclosure; H is the castle of Bois surrounded by gardens, a pleasure house of the king. At L is the mansion of the duke of Brittany. At C is the palace of king Robert and the monastery of S. Martin-des-Champs surrounded by a fortified enclosure. At B, the Temple forms a separate citadel with its walls and keep. At G mansion Vauvert built by king Robert, also was s surrounded by an enclosure.

Note 1. p. 368. Hist. de la Civil. en France. Part 2, 1 st lesson.

Note 1. p. 369. At I was the House of S. Lazare. At K the hospital for lepers. At M and N the markets. At O the Grand Chatelet (prison), that defended the north entrance to the island; at P the Little Chatelet, that guarded the little bridge at the south. At E Notre Dame and the bishop's palace. At D the old palace. At F S. Genevieve and the palace of Clovis on the hill. (Description de Paris, by N. de Fer. 1724. Dissertation archaeologique sur les anciennes enceintes de P Paris, by Bonnardot. 1853.

Later during the captivity of king John, it was necessary to enlarge this enclusure, especially at the right bank, since the city always became larger (19), the Louvre and the Temple finding themselves comprised within the new walls, but the w well defended gates, furnished with barbicans could take the place of detached forts, and at the east side Charles V caused the erection of Bastile S. Antoine, which commanded the suburbs and strengthened the enclosure. The palace of Tournelles R a also reinforced this part of the city, and also the Temple and the Louvre, retaining their enclosures, formed with the Bastile as many internal citadels. We have already stated, that the system of fortification of the middle ages did not lend itself to extended defenses; it lost its power in occupying too great a perimeter, when it was not accompanied by these advanced f fortresses, that divided the forces of the besiegers and prevented approach. We have seen at Carcassonne (Fig. 11) a city of small dimensions well defended by art ban the nature of t the ground; but the castle formed a part of the city, being only its citadel, and has not the character of a feudal castle, while at Coucy, for example (20), although the castle may

the 14 th century,"adds the illustrious historian,"was changed their character. Then commenced the foreign wars, no longer of vassal with sovereign or of vassal with vassal, but of a people with people, of government with government. At the accession of Philip of Valois broke out the great wars of the French with the English, the claims of the kings of England, not for a certain fief, but for the country and throne of France; and these were prolonged till Louis XI. Feudal wars then no longer occurred, but national wars; a certain proof that the feudal epoch had stopped at those limits, that another society had already commenced." So the feudal castle assumes its actual defensive character only when it is isolated, when distant from great cities, rich and populous, and it dominates the little city, market town or village. Then it profits by the arrangement of the site with great care, is surrounded by precipices, ditches or rivers. When it adjoins the great city, it becomes its citadel and is compelled to subordinate its defenses to those of the urban surroundings, to locate itself at the point where it can remain master of the interior and the exterior. To make it understood in few words, one may say that the actual feudal castle, from the point of view of the art of fortification, is that which after selection of its site sees habitations gradually grouped around it. A different thing is the castle whose erection being after that of the city, must subordinate its location and arrangement to the situation and the defensive arrangements of the city. At Paris, the Louvre of Philip August was evidently constructed according to the last requirements. Until the reign of that prince, the k kings usually inhabited the palace situated in the city. But when the city had assumed a great extension on both banks, th that central residence could not suit a sovereign, and it became useless as a defense. Philip August in building the Louvre placed a citadel at the point of the city where attacks were most to be feared, at which his formidable rival Richard must appear; he watched over both banks of the Seine below t the city, and commanded the marshes and fields, which at that point extended to the slopes of Chaillot and even to Meudon. In surrounding the city with walls, he took care to leave his new castle, his citadel, outside their enclosure, so as to retain his freedom of defense. In this plan of Paris (18) may

An army takes a city without the besiegers having scarcely s seen the defenders; they have seen before them during entire weeks only slopes of earth and a little smoke. The breach is practicable and the place capitulates; the whole falls in the same day; a piece of wall has been battered, a little earth overthrown, and the city and the bastions, that have not even seen the smoke of the guns, magazines and arsenals, everything is surrendered. But some centuries since things were very different. If a garrison were faithful and disciplined, it was e necessary to make each tower yield, so to speak, to treat with each, if he pleased to defend hand to hand the post entrusted to him. At least all was arranged so that matters must p proceed thus. One was accustomed to only count on himself and his men, and he defended himself against all. Thus (for one may reason from the little to the great) it did not then suffice to take the capital of a country to possess the entire country. That was the period of barbarism, if you will, but of a barbarism full of energy and of resources. The study of those great military monuments of the middle ages is then not merely curious, but it makes known the customs in which the national spirit could only succeed in becoming strengthened.

We see at the beginning of the 13 th century the inhabitants of Toulouse with some nobles and their knights in a badly enclosed city hold in check the army of the powerful count de Montfort, and force it to raise the siege. Much better than cities, the great vassals shut within their castles believed themselves able to resist not only their rivals, but their sovereign and his armies. "The proper general character of feudalism," says M. Guizot, "is the separation of the people and the power into a multitude of little peoples and of little sovereigns; the absence of any general notion of a central government. To what enemies did feudalism succumb? Who fought in France? Two forces; royalty on the one hand; the communes on the other. By royalty was formed in France a central government; by the communes was formed a general nation, that grouped itself around the central government.[1] "The development of the feudal system was then limited to from the 10 th to the 14 th centuries. Then feudalism erected its most important f fortresses, that caused the military training of the western peoples during the struggles of one land with another. "With the 14 th century," adds the illustrious historian, "was

the moment when the breach will be practicable, when the attacking columns will enter such a work. It is a part requiring more or less time to play, that the besieger is always sure to win, if the material be not lacking to him, and if he has an army proportioned to the strength of the garrison. "A place attacked is a place taken," says the French proverb. [1] But th then no one could tell when and how a place must fall into the power of the besiegers, however numerous they were. With a determined and well supplied garrison, the siege could be prolonged indefinitely. Thus it is not rare to see a little town resist for entire months a numerous and disciplined army. Therefore frequently this boldness and insolence of the weak o opposed to the strong and powerful, this habit of individual resistance, that formed the basis of the character of feudalism, that energy which produced such great things in the midst of so many abuses, that allowed the French and Anglo-Norman peoples to recover after terrible reverses, and to found stronly constituted nations.

Note 1. p. 366. Like many others, this saying is however not absolutely true, and many examples prove it wrong. It is certain that even today a place defended by a skilful and ingenious commandant, whose glance is quick, can hold out much longer that that defended by one accustomed to routine, and who does not find in his intellect new resources for each phase of the attack. Perhaps since a siege has become a science, a sort of formula, one holds too cheaply all those resources in detail, which were still employed in the 16 th century. It is not doubtful that archaeological studies have had such great influence on other branches of architecture, and equally react on military architecture; for in our opinion (and it is shared by competent persons), if there is nothing in the form of the fortifications of the middle ages, that it may be well to use today, in opposition to the powerful means of artillery, it is not the same with its spirit and its principle.

Nothing is more suitable for emphasizing the profound differences, that separate the characteristics of men in those d distant times, than a comparison of a city or fortified castle in the 13 th or 14 th centuries and a modern strong place. In the latter nothing is striking in the view, all is apparently uniform, and it is difficult to recognize a bastion anywhere.

to the 16 th centuries, he is struck by the care taken to guard against surprises; all precautions are taken to stop the enemy and embarras him at every step, not by complicated arrangements but by turns impossible to foresee. Evidently a siege before the invention of cannon was not really as serious for the besieged as for the assailants, except when they came to hand to hand combat, so to speak. A disciplined garrison fought with some chances of success until in its last defenses. The enemy could enter the city by scaling or by a breach without the surrender of the garrison for that; for then being s shut up in the towers, that I repeat were as many forts, it resisted a long time, exhausted the stеength of the enemy, c caused it to lose mem at each partial attack; for it was necessary to break through a great number of well barricaded doors, to fight hand to hand in narrow and inconvenient places. If one took the ground story of a tower, the upper stories s still retained powerful means of defense. It is evident that all was calculated for a possible struggle foot to foot. The winding stairs that gave access to the various stories of the towers were easily and quickly barricaded, so as to render v vain the efforts of the assailants to ascend from one story to another. Had the inhabitants of a city desired to capitulate, the garrison could protect itself from them, and forbid their access to the towers and curtains. That was a system of mistrust adopted toward all.

In these details of defense foot to foot appears the art of fortification from the 11 th to the 16 th centuries. By carefully examining, by studyind scrupulously even the least traces of the defensive obstacles in these epochs, one comprehends the tales of the colossal attacks, that we are too much disposed to charge with exaggeration. Before these means of defense so well foreseen and combined, one conceives without trouble the enormous labors of the besiegers, those movable towers, stockades, ramparts or forts, that were opposed to the besieged, who had calculated all chances of an attack, who f frequently assumed the offensive, and who were disposed to y yield a point only to retire into another and stronger one.

Today, thanks to artillery, a general that invests a place not aided by an army in the field, can foresee the day and h hour when the place will fall. He will announce in advance

and arrows through the slots of the galleries. If they are m numerous and bold, they can at night try to burn the tower, the palisades and machines, leaving by some postern distant from the point of attack; but if timid or demoralized, if they cannot dispose of a bold and devoted troop, at the break of day its moat will be filled, the floor of timbers slightly inclined toward the curtain will allow the tower to advance rapidly by its own weight, the assailants only having to support it. On the ruins of the gallery broken in pieces by stones cast by the machines, the movable bridge of the tower will suddenly drop, and a numerous troop of knights and picked men will throw themselves on the terrace of the curtain.(16). But that catastrophe is foreseen; if the garrison be faithful, ab- abandoning the lost curtain it will shut itself up in the towers that interrupt it at certain distances; (17) [1] it can rally, rake the terrace and cover it with projectiles, make a s sudden sortie by the two gates A and B, while the assailants seek to descend into the city, and before they become too numerous, overthrow them, take the tower and burn it. If the b beaten garrison cannot attempt this bold stroke, it barricades itself in the towers, and the assailants must besiege each one, for at need each tower can be a separate and independent f fort; many are furnished with well, ovens, and cellars for s storing provisions. The doors placing the towers in communication with the tops of the curtains are narrow, well ironed, shut inside, and are reinforced with beams of wood, that enter into the thickness of the wall, so that in an instant the door can be shut, and quickly barricaded by drawing the wooden bar. (Art. Fermeture).

Note 1. p. 361. The castle of the city of Carcassonne is f from the beginning of the 12 century, all its towers and curtains being well equipped with projecting galleries, that must have projected strongly, on account of the precautions taken to prevent the sag of the wooden floors. (Art. Hourd).

Note 1. p. 364. The example given here is taken from the i inner wall of the city of Carcassonne, the part built by Philip the Bold. The plan of the towers is taken at the level of the curtain; these are the so-called towers of Dorejo and of S. Laurent at the south side.

When one studies the defensive system adopted from the 12 th

if in some remarkable sieges, after a long defense, the besieged were reduced to uncover their houses, demolish the walls of their gardens, to take boulders from the streets to supply the galleries with projectiles, and force the assailants to leave the foot of the fortifications. These galleries were p placed quickly and easily (Art. Hourd); they were removed in time of peace. We give here (15) the works for approaching a curtain flanked by towers with a moat full of water, in order to make intelligible the various means of defense and attack just mentioned. In the first plane is a cat A; it serves to f fill the moat and advances toward the foot of the wall over the heap of fascines and materials of all sorts, that the assailants continually cast through its front opening; a wooden floor is arranged as the cat advances and allows it to be rolled without fear of seeing it sink in the mud. The machine is either moved by internal rolles by means of levers, or by cords and pulleys B. Besides the shed placed at the head of the cat, palisades and movable mantlets protect the laborers. The cat is covered with fresh hides to protect it from inflammable materials cast by the besieged. Before advancing a cat against the curtain in order to undermine its base, the assailants have destroyed the gallery of that curtain by projectiles cast by throwing-machines. Farther at C is a big stone-thrower; it batters the gallery of the second curtain. This machine is ready, and a man puts the sling in place with its stone. A h high palisade protects the machine. At the side crossbow men posted behind rolling mantlets aid at the besieged, that show themselves. Beyond at E is a tower equipped with its movable bridge and covered by fresh hides; it advances on a floor of timbers as fast as the assailants fill the moat, being protected by palisades; like the cat it is moved by ropes and pulleys. Still beyond that is a battery of two stone-throwers, th that cast barrels filled with buring materials against the g galleries of the curtains. In the city on a great square tower ending in a platform, the besieged have mounted an engine to batter the tower of the assailants. Behind the walls another stone-thrower is masked by the curtains and casts projectiles against the machines of the assailants. Until the machines of the hostile army arrive at the foot of the walls, the part of the besieged is almost passive; they are content to send bolts

ft. from the ground of the barriers to the bottom of the galleries. The ground serving as basis for the two enclosures not being in a horizontal plane, but presenting considerable differences of level, the ramparts conform to the form of the ground and the defensive galleries follow the inclination of the top of the wall. (Art. Courtine). There were then the data, rules and formulas for military architecture, as there existed for religious or civil architecture. The remainder of this Article will prove it abundantly, we believe.

With the system of battlements and slots for archers out in the stone parapets, one could not prevent numerous and bold assailants, protected by cats covered with hides or mattresses, from undermining the foot of the towers or curtains, since the slots in spite of their inclined section, it was impossible to see through them the base of the fortifications or from t the battlements without extending the body half out, one could no longer see an object placed at the bottom of the wall. It was then necessary to erect projecting galleries, well equipped with defenses, permitting a great number of the besieged to reach the foot of the walls or towers with a hail of stones and projectiles of all kinds. Let (14) be a curtain crowned by battlements and slots for archers; the man at A can see t the pioneer B only by passing his head outside the battlements, but then he completely exposes himself, and always when pioneers were at the foot of a wall, care was taken to protect t their work by flights of arrows or crossbow bolts against the parapets, when the besieged allowed themselves to be seen. In time of peace, from the 12 th century, [1] men equipped the parapets with projecting galleries C in order to completely command the foot of the walls by means of continuous holes D. N Not only did the galleries perfectly fulfil that purpose, but they left the defenders free in their movements, the store and supplying the projectiles being made within the parapet at E. Besides if these galleries were furnished with slots as well as the continuous openings, the archers' slots in the stone construction were masked in their lower part and allowed archers or crossbow men posted inside the parapet to shoot at the assailants. With this system, the defense was as active as p possible, and only the lack of projectiles could allow some respite to the assailants. Then one should not be surprised

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buildings by wooden bridges, that were easily removed. Thus after the castle was taken, the remainder of the garrison could still take refuge in that enormous tower, entirely closed, and hold out for some time. At S is a vast watch tower dominating the entire city and its suburbs; it only contained a w wooden stairway. The towers X and Y, the gate O and the intermediate curtains are of the 12 th century, as well as the watch tower and the substructures of the buildings on the side next the barbican. These structures were completed and restored under S. Louis. The great barbican of the Aude had two s stories of slots and an upper gallery with battlements, that could be equipped with a wooden defensive gallery. [1] Here (13) is a cavalier view, that we have made from the plan (12); it is easy to find the position of each part of the defense. We have assumed the fortifications as if armed in war, and furnished with their wooden defenses, bays, defensive galleries, and advanced palisades.

Note 1. p. 338. See Art. Hourd for details of construction of this kind of defense.

But before proceeding further, it is necessary to know well what defensive galleries (hourds) were, and the motives that caused their adoption from the 12 th century.

Men had recognized the danger from wooden defenses at the level of the ground, as the assailant could easily set fire to them; and from the time of S. Louis the barriers and barbicans of wood, so frequently employed in the preceding century, were replaced by external enclosures and barbicans in masonry. Yet they did not renounce defenses of carpentry, but contented themselves with placing them high enough to render their burning by projectiles difficult, if not impossible. Then as today (and the fortifications of the city of Carcassonne give us an example), when good defenses were desired, men took care to retain everywhere above the ground serving as base at the foot of walls and towers, a minimum height, so as to protect them equally from scaling in their extent. This minimum height is not the same for the two external and internal enclosures, t the curtains of the first defense being maintained at about 33 ft. from the bottom of the ditch or from the top of the s slope of the ground to the bottom of the defensive galleries, while the curtains of the second enclosure have at least 46

tower Tresau (Fig. 11) and the angle of the castle, it was f first necessary to climb a very steep ramp and scale the rocks. Besides in attacking gate V from the north, the besiegers presented their flank to the defenders on the high walls and towers of the second defense. The great partition wa,, Z, that leaves the curtain wall of the castel, advances at a right a angle to the descent to the barbican, was crowned transversely by machicolations, that commanded the gate H and terminated at its end in a watch tower, that allowed one to see all that passed on the ramp descending to the barbican, so as to make internal arrangements for defense in case of surprise, or to reconnoitre troops ascending from the barbican to the castle.

The castle could then hold out a long time after the city a and its suburbs were in the power of the enemy; its garrison easily defending the barbican and its ramp, remained masters of the Aude, whose bed was then nearer the city than it is today, receiving provisions by the river and preventing a blockade on that side; for it was scarcely possible for a body of soldiers to post itself between that barbican and the Aude without danger, having no means of covering itself, and the flat and marshy ground being commanded from all sides. The b barbican again had the advantage of placing the king's mill in communication with the garrison of the castle, and the mill itself was fortified. A plan of the city of Carcassonne, made in 1774, notes in its descriptive notes a great subterranean chamber as opening beneath the rampart next the barbican, but long since shut up and partly filled. Perhaps this excavation was intended to establish open communication between the mill and the fortress.

On the city side, the castle of Carcassonne was likewise p protected by a great barbican C before the ditch. A gate A' was well defended and gave entrance to that barbican; the bridge C communicated with the principal gate D. Vast porticos N were destined to lodge a garrison temporarily in case of s siege. As for the ordinary garrison, it lodged at the side n next the Aude in the three story buildings Q, P. Next the portico N at the south side was a vast armory pierced by slots on the side next the ditch, and lighted from the court M. R, R were keeps, the largest being isolated from adjacent structures by being detached, and only communicating with the other

crowned by the machicolations of the third communicating with the upper terraces of the castle. If by an impossibility, they obtained possession of the second story, they found no entrance except by a little door opening into E, a second hall situated along the walls of the castle, and only communicating with that by turns, that it was easy to barricade in an instant, and which were further defended by strong doors. If in spite of all these accumulated obstacles, the besiegers forced the third gate, it was then necessary to attack the postern I of the castle, guarded by a system of formidable defenses; a archers' slots, two series of machicolations placed over each other; a bridge with movable floor, portcullis and door leaves. If they took that gate, they were 23 ft. below the internal court L of the castle, that was reached only by narrow stairs, and by passing several gates at K.

Note 1. p. 353. Among others the tower called Tresou and gate Norbonne. (Arts. Porte, Tour).

Note 1. p. 355. The plan given here is at the scale of 1\1500 full size. The barbican of Carcassonne was destroyed in 1821 to build a mill; its foundations alone exist, but its ramps are preserved in great part, particularly in the part adjoining the castle, that is the most interesting.

Assuming that the attack was pressed at the side from the bridge of the Aude, it would be stopped by a post T, a gate with a work in wood and a double machicolation pierced in the floor of an upper story communicating with the great south hall of the castle, by means of a wooden passage, that could be destroyed instantly; so that in taking that upper story, nothing had been done. If after having passed the gate on the ground floor, they pushed farther along on the patrol route beside the square tower S, they would soon find a gate well equipped with machicolations and built parallel to the corridor C H. After that gate and those defenses was a second narrow and low doorway pierced in the great partition wall 7, t that must be forled; finally, the reached the postern I of the castle. If on the contrary (a thing scarcely possible), the assailant presented himself at the side opposite the northern barriers, he was stopped by a defense V. But the attack could not be attempted, for this is the point of the city best defended by nature, and to force the first enclosure between the

create a diversion in case the enemy pressed too strongly against the defenses of that gate or the barbicau, set fire to the machines, towers or cats of the besiegers. It is certain that great importance was attached to barbicans; they allowed the besieged to make sorties. Thus the barbican of Carcassonne is of great interest; (12) built below the top of the bank on which was erected the castle, it places that in communication with the banks of the Aude; [1] it forces the assailants to remain far from the ramparts of the castle; large enough to contain 1500 to 1800 infantry, without counting those on the ramparts,it allowed the concentration of a considerable body of troops, that by a vigorous sortie could drive the besiegers into the river. The barbican D of the castle of the city of Carcassonne completely masks the gate B, that the ramps look out on the country. These ramps E have battlements at right and left. Their route is intersected by parapets with alternating entrances, and the entire work ascends by a steep slope to the city, and is swept in its whole length by a tower and two upper curtains. If the besiegers reached the top of the first ramp, they would have to wheel at E' and be struck in flank; they would find at F a fortified parapet, then a gate well equipped and with battlements; if they passed this first gate, it would be necessary to pass along a parapet pierced by slots for archers, to force a barrier, then turn abruptly and take a second gate G, still struck in flank. Then they find themselves before a considerable and well defended work; this was a long corridor under two stories to be passed; the former closed the last gate by a wooden defense, and it was pierced by machicolations in the length of the passage. The second communicated with the battlements looking outward, toward the ramp, or even above this passage. The floor of the first story communicated with the route of the patrols of the barriers only by a small gate. If the assailants succeeded in entering by scaling, they were taken in a trap; for the little gate being shut to them, they found themselves exposed to projectiles cast through the machicolations in the second story, and the end of the floor stopping abbuptly at H on the s side opposite the entrance, it was impossible for them to go farther. If they passed out of the corridor on the ground floor, they were stopped by the third gate H, pierced in a wall

that forbade the use of machines and to bring them. On the s side of the city this castle was defended by a wide moat N a and a barbican E, built by S. Louis. From the great barbican at the Aude gate to C one ascended by a steep road with battlements on the side next the valley, so as to defend the entire reentrant angle formed by the ramps of the castle and the walls of the city. At B is located the gate Narbonne at the east, that was furnished with a barbican and protected by a moat and a second barbican with palisades alone. At S on the side that one could reach the foot of the walls almost on a level, is a broad moat. This moat and its approaches are commanded by a strong and high tower O, an actual isolated keep, able to sustain a siege by itself alone, even if all the first enclosure at this side had fallen into the power of the assailants. We have every reason to believe, that this tower communicated with the internal walls by means of a subterranean passage reached by a well sunk in the lower story of this keep, but which being filled today has not yet been recognized. The barriers are comprised between the two enclosures of gate Narbonne at X, Y as far as the corner tower at Q. If the besiegers obtained possession of the first defenses of the south side, and if they desired according to the barriers to reach the A Aude gate at C, they found themselves stopped by a square tower R standing across both walls and furnished with barriers and machicolations. If they succeeded in passing between gate Narbonne and the barbican at B, which was difficult, it was necessary to pass a narrow space to reach V in the northeast barriers, commanded by an enormous tower M, called tower of the Tresau. From B to V they were taken in flank by the high towers of the Visigoths, repaired by S. Louis and Philip the Bold, and then they found a defense at the angle of the castle. At D is a great postern protected by a barbican P; other smaller posterns are scattered along the enclosure and allow patrols to make the tour of the barriers, and even to descend into the country without opening the principal gates. That w was an important point; one notices that the postern pierced in the tower D opening into the barriers is placed at the side, masked by the projection of the angle buttress, and the threshold of this postern is more than 6.6 ft. above the external ground; it was then necessary to place ladders to enter or l

Louis at the instance of bishop Radulphe by letters patent a allowed the exiled citizens to rebuild a city on the other s side of the Aude, not wishing to have near the city subjects so unfaithful. The S. king commenced by rebuilding the external enclosure, which was not sufficiently strong, and that h had been greatly injured by the troops of Trencarel. He erected the enormous tower called the Barbican, as well as the r ramps, that command the Aude and the bridge; he permitted the garrison of the castle to make sorties without fearing the b besiegers, if they were masters of the first enclosure. There is every reason to believe, that the walls and external towers were erected very rapidly after the unsuccessful expedition of Trencarel, to rapidly protect the city from a sudden attack, while time was taken to repair and extend the inner enclosure. The towers of that outer or first enclosure were open on the side next the city, so as to render their possession useless to the besieger, and the terraces beside the curtains are at the level of the ground of the barriers, so that if taken, they could not serve as a rampart against the besieged, who being in force always on the level, could cast themselves on the a assailants and tumble them into the moat. (Arts. Courtine, Tour).

Note 2. p. 352. The suburbs that surrounded the city of Carcassonne were enclosed by walls and palisades at the time of the siege described by the commander, William des Ormes.

Philip the Bold at the time of the war with the king of Arragon continued his labors with great activity until his death. (1285). Carcassonne then found itself a place near a very important frontier, and the king of France held his parliament there. He caused to be erected the inner enclosure at the south side, and repaired the walls and towers of the enclosure of the Visigoths. (11). We give here the plan of this place so modified. At A is the great barbican on the bank of the Aude mentioned above, with its fortified ramps up to the castle F. These ramps are arranged so as to be commanded by the external defenses of the castle; it was only after having passed several gates and followed numerous turns, that the assailant (admitting that he had possession of the barbican) could reach the gate L, and it was necessary there to make a regular siege of the castle, in a narrow space completely surrounded by very high towers and walls, having behind him a precipice,

various sorts and hand crossbows. Buckets are filled. Everywhere on the rounds the crowd of people is armed with axes, maces, poles with spear heads, and the women of the people carry vessels, great stones easy to grasp and to throw. The city is finely fortified at its gates; also beautifully and well ranged are the barons of France, equipped with fire, ladders and heavy stones, approaching in various ways to seize the b barbicans." [1]

Note 1. p. 351. probably crossbows on wheels.

Note 2. p. 351. probably raised wooden towers.(10).

Note 3. p. 351. Wooden tubs in which grapes are transported in time of harvest are now still called semols, more frequently compote. These are are oval buckets with wooden handles, t through which are passed two poles like a stretcher.

Note 1. p. 352. Between the barriers.

But the siege dragged along, and the winter season came; t the count de Montfort postponed the operations of the attack until spring. During this time the people of Toulouse strengthened their defenses. "Within and without were only seen workmen who equipped the city, gates, ramparts, walls, defensive and double galleries, moats, barriers, bridges and stairways. These in Toulouse were only carpenters, who made wooden towers, double, portable and with doors, who in castle Narbonnais, b before which these are built, left neither towers, hall, battlements nor an entire wall." Simon de Montfort returned, surrounded the city more closely, took two towers that commanded the banks of the Garonne, fortified the hospital, situated o outside the ramparts, and made of it a fort with moats, palisades and barbicans. He built the good enclosures with open ditches, and walls pierced with slots in several stories. But after many assaults, many deeds of arms without result for t the besiegers, the count de Montfort was slain by a stone cast by a machine, worked by women near S. Sernin, and the siege was raised.

On the return from the first crusade, S. Louis desired to make Carcassonne one of the strongest places in his domain. The inhabitants of the suburbs, who had opened their gates to the army of Trencarel [2] were driven from their houses, burned by him, whose cause they had embraced, and their ramparts were razed. It was not till seven years after this siege, that S.

and the situation of the place did not permit driving mine g galleries, placing posts under the foundations, and setting fire to them. As for means of defense, there is constantly in this history of the crusade against the Albigenses a question of barriers, of wooden barriers and palisades. When Simon de Montfort was obliged to return to besiege Toulouse, after having razed nearly all the towers, he finds the city defended by ditches and wooden works. Castle Narbonnais alone is s still in his power. Guy de Montfort, brother of the count first arrived with those terrible crusaders. The knights have dismounted, broken down the barriers and gates, penetrated into the streets, but were there received by the inhabitants, and the men of the count of Toulouse were forced to beat a re-retreat, when Simon arrived full of rage:-- "Why," said he to his brother, "have you not already destroyed the city and burned its houses?" "We have attacked the city," replied Count Guy,"broke through the defenses, and found ourselves mixed w with the inhabitants in the streets; there we met knights, c citizens, workmen armed with maces, spears, sharp axes, who with great cries and shouts gave us great mortal strokes, have by us sent your rents and quitrents, and perhaps lord Grey, your marshal, will tell you how many silver marks they sent us from the tops of the roofs! By the faith I owe you, there is among us none so brave, that when they hunted us out of t the city through the gates,better loved the excitement of a pitched battle." Yet the count de Montfort was compelled to undertake a regular siege after new and fruitless attacks. "He posted his troops in the gardens, equipped the walls of the castle and the orchards with crossbows on wheels, and sharp arrows. On their part the men of the city with their legitimate lord strengthened the barriers, occupied the ground in the vicinity, and raised in various places their banners with two red crosses with the insignia of the count (Raymond), while on the scaffolds, [2] and in the galleries,[3] were posted the most valiant men, the bravest and most faithful, armed w with poles with spear heads, and with stones to drop on the enemy. Below on the ground remained others bearing lances and darts for defending the barriers, so that no assailant should approach the palisade. At the arrow slots and the battlements the archers defended the towers and curtains with bows of va-

in seven places. We have nearly everywhere countermined, and have not spared labor. They began to mine on leaving their h houses, so that we knew nothing of it before they reached our barriers.

Done at Carcassonne, Oct. 13. 1240.

Know, Madame, that the enemy burned the castles and open p places, that he met with in his flight."

As for the battering ram of the ancients, it was certainly employed to batter the foot of the walls in sieges after the 12 th century. We again borrow a passage from the Provencal poem of the crusade against the Albigenses, that can leave no doubt in that respect. Simon de Montfort desired to assist the castle of Beaucaire, that held out for him, and that was besieged by the inhabitants; he besieged the city, but had not constructed sufficient machines; the assaults had no results; during this time the Provencals pressed the castle (capitol) more and more. "But those (men) of the city erected against (the crusaders shut up in the castle) machines, that so battered the capitol and the watch tower, that the timbers, stone and lead of them were shattered; and at holy Easter was set up the battering ram, which is long, ironed, straight and small, that strikes so hard, cuts and breaks, that the wall was injured, several stones being detached here and there; but the besieged were not discouraged, when they perceived this. They made a noose of rope attached to a wooden machine (windlass ?), by means of which the head of the ram was caught and held. By this those (men) of Beaucaire were greatly troubled, until t the coming of the engineer, who started the use of the ram. And several of the besiegers were concealed in the rock in t the rock to attempt to penetrate the wall by blows of sharp picks. Those in the capitol having perceived them, consulted, mixed in a cloth fire, sulphur and tow, that they lowered from the wall at the end of a long chain, and when the fire has c caught and the sulphur melted, the odor suffocated them (the pioneers) to such an extent, that not one of them could remain. But they came to their stone-throwers, and worked them so well, that they broke and split the barriers and beams." [1]

Note 1. p. 350. See Provencal poem in the Note.

This curious passage shows what were the means then employed to batter walls directly, when it was desired to make a breach,

themselves, that in delivering their assaults, they experienced the greatest losses.

Then on a Sunday, they assembled all their men at arms, crossbow men and others, and together assaulted the barbican b below the castle.[1] We descended to the barbican and cast so many stones and shot so many bolts at them, that we made them abandon that assault; some of them were killed and wounded.[2]

Note 1. p. 349. The principal barbican, situated on the bank of the Aude at the west. Fig. 9.

Note 2. p. 349. Indeed it was necessary to descend from the castle situated on the top of the hill to the barbican commanding the suburb below the precipice. (See the plan of the city of Carcassonne after the siege of 1240, Fig. 11.

But the Sunday following, after the feast of S. Michel, they delivered a very great assault on us; and thanks to God and to our men, who had a good will to defend themselves, we repulsed them; several among them were killed and wounded; none of ours, thank God, were killed or received a mortal wound. But then on Monday, Oct. 11, about evening, they heard a rumor that your men, Madame, were coming to our help, and they set fire to the houses of the suburb of Carcassonne. They entirely destroyed the houses of the minor friars, and the houses of a convent of the blessed Maria, that were in the suborb, to take the timbers of which their palisades were made. All those, w who were at the said siege, abandoned it secretly the same n night, even those of the suburb.

As for us, we were well prepared, thank God, madame, to await your help, so that during the siege none of our men lacked provisions, however poor he was; further, Madame, we had in abundance wheat and meat to wait for a long time your help, if this had been necessary. Know, Madame, that these malefactors on the second day from their arrival, slew twenty priests and other clergy, whom they found on entering the suburb; know f further, Madame, that lord Pierre de Voisin, your constable of Carcassonne; Raymond de Capendu; Gerard d'Ermenville, have be-behaved very well in this affair. Yet the constable by his v vigilance, his valor and his coolness has distinguished hims-self above the others. As for the other affairs of the land, Madame, we can tell you the truth, when we shall be in your presence. Konw then that they had commenced to mine strongly

them and us, higher than the barrier, and we countermined. T Then they set fire in their mine, and we lost some ten fathoms (60 ft.) of our battlements. But we immediately made a good and strong palisade, and above we built a good overhanging t tower (10) [3] with good slots for archers; [4] so that not one of them dared to approach us in that part.

Note 1. p. 347. At the southwest angle, Fig. 9.

Note 2. p. 347. Probably some advanced work of the fortification of the Visigoths.

Note 3. p. 347. See text and poems.

The low overhanging towers were frequently extended as defensive galleries (Art. Hourd). Those mentioned by the commander William de Ormes in his report to queen Blanche were temporary works, erected behind the palisade to oppose the assailants after they had made a breach. We have shown (10) the work mentioned by the commander of Carcassonne.

Note 4. p. 347. Slots were tall and narrow openings made in the masonry of towers and curtains, or in the defensive galleries and palisades for shooting arrows and crossbow bolts at the assailants. (Art. Meurtriere).

They likewise commenced, Madame, a mine against the barbican of the gate of Rodez, [5] and they kept themselves beneath, because they desired to reach our wall, [1] and they marvellously made a great way, but perceiving this, at once we built above and below a great and strong palisade; also we countermined, and meeting them, we took from them their mine gallery. [2]

Note 5. p. 347. At the north, Fig. 9.

Note 1. p. 348. This passage as well as those preceding, de describing the mining of the besiegers, clearly proves that then the city of Carcassonne had a double wall! indeed the besiegers here passed under the first enclosure to mine the inner rampart.

Note 2. p. 348. Thus when the besieged had knowledge of the work of the miner, they erected palisades above and below the assumed exit of the gallery, so as to take the assailants between the enclosures, which they were compelled to force in order to proceed farther.

Know also, madame, that from the beginning of the siege, t they did not cease to assault us; but we had so many good crossbow men and men inspired with good will to defend themsel-

de Tour and many others of Carcassonne. In the two places they had so many crossbow men, that no one could leave the city.

Then they set up a mangonel against our barbican; and we o ourselves at once set up within the barbican a Turkish stone= thrower, [3] that cast projectiles toward the said mangonel and around it, so that when they would fire on us, and would strike the post of our stone-thrower, they fled and entirely abandoned their mangonel; and there they made ditches and palisades. We likewise, each time that we used the stone-thrower, retired from that place, because of the ditches, crossbow bolts and the wall there.

Note 3. p. 346. See Latin text of Note.

Then Madame, they commenced a mine against the barbican of the gate Narbonne; [4] and immediately, having heard their subterranean work, we countermined, and we built within our barbican a great and strong wall of dry stones, so that we retained the full half of the barbican, and they set fire in the hole that they had made; so the wood having burned, a front part of the barbican fell.

Note 4. p. 346. At the West; see Fig. 9.

They began to moni against another turret of the barrier; [5] we countermined and succeeded in obtaining possession of the mine gallery that they had made. Then they commenced a mine between us and a certain wall, and they destroyed two battlements of the barrier; but we built there a good and strong p palisade between them and us.

Note 5. p. 346. At the south; see Fig. 9. A barrier was the name of an external wall or a wooden palisade established outside the walls, and which formed a sort of covered way; nearly always a ditch of small depth protected the barrier, and sometimes a second ditch was found between it and the wall. By extension the name of barrier was given to the area comprised between the palisade and the wall of the place, also to external enclosures, even when later built in masonry and flanked by towers. The palisades surrounding camps were also termed barriers. (See remainder of note).

They also mined the angle of the place toward the house of the bishop, [1] and by means of mining they came beneath a certain wall, even to the wall of the barrier. But as soon as we perceived this, we built a good and strong palisade between

a curious report by the commander of Carcassonne, William des Ormes, addressed to queen Blanche, regent of France during t the absence of S. Louis, on raising the siege made before that place by Trencavel in 1240. [1] At that epoch the city of Carcassonne was not fortified as we see it today; [2] it only comprised the enclosure of the Visigoths, repaired in the 12 th century with a first enclosure or barrier, that could not have great value (Fig. 9) and some advanced works (barbicans). The report details the operations of the attack and defense of t that place, given by the commander in Latin; here is the translation.

"To the excellent and illustrious lady Blanche, by the grace of God, queen of the French, William des Ormes, commander of Carcassonne, her humble, devoted and faithful servant, greeting.

Note 1. p. 345. Bibl. de l'Ecole des Chartes, Vol. 7, p. 363. Report published by M. Douet d'Arcq. This text is reproduced in the Studies on Artillery, by prince Louis Napoleon Bonaparte, president of the republic, a work previously cited, and from which we borrow the faithful translation here given.

Note 2. p. 345. S. Louis and Philip the Bold executed vast works in fortification at Carcassonne, to which we shall return.

Madam, may your excellency learn by these presents, that the city of Carcassonnewas besieged by the pretended vicount and his accomplices on Monday, Sept. 17, 1240. And at once we who were in the place took from them the market town Graveillant, which is before the Toulouse gate, and there we had much timber and carpentry, of which we have made good use. The said town extended from the barbican of the city to the angle of the s said place. The same day the enemy took from us a mill, because of the multitude of his men; [1] then Oliver de Termes, Berard Hugon de Serre-Longue, Gerard d'Aniort, and those with them camped between the angle of the city and the water, [2] and the same day by the help of the moats found there and cutting the roads between them and us, they shut themselves up there, so that we could not go to them.

Note 1. p. 346. This was probably the king's mill, situated between the barbican of the castle and the Aude.

Note 2. p. 346. At the west, see Fig. 9.

On another side, between the bridge and the barbican, lodged Pierre de Ferrouillet and Renaud du Puy, William Fort, Pierre

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artillerie, by prince Louis Napoleon Bonaparte, President of the republic. Vol. 2 of this work, full of learned research, is certainly the most complete of all those occupied with ancent machines; here is the descriptiou given by the illustrious author:-- "It consisted of a timber called beam or sweep, turniug on a horizontal axis supported by posts. At one end of the beam was fixed a counterpoise, at the other a sling containing the projectile. To set the machine, i.e., to bring down the beam a windlass was used. The sling war the most important part of the machine, and from experiments and calculations made by Col. Dufour iuserted in his interesting essay on the war machines of the ancients (Geneva, 1840), this sling so increased the range as to more than double it, i.e., that if the beam had terminated with a cup, as occurred in several casting machines in antiquity, all things being equal, the p projectile would have been thrown less than half as far as with the sling.

"Experiments that we have made at a small scale have given us the same results."

A machine of this kind was made at large size in 1850 by order of the president of the republic, and was tried at Vincennes. The beam was 33.8 ft. long, the counterpoise was 4.96 t tons, and after some trials a ball of 53 lbs. was thrown to a distance of 574 ft., a shell 8.7 ins. diameter filled with with earth to 476 ft., and shells 10.6 ins and 12.6 ins diameter filled with earth to a distauce of 394 ft. (See Report to the Minister of War by Capt. Fave. Vol. 2. p. 38 et seq.

From all time the mine has been in use to destroy parts of walls and to make a breach. The miners, as far as the ground permitted, made a trench outside the moat, passed uuder this to reach the foundations, undermined them and supported them by posts, then set fire to the posts and the wall fell. To p protect themselves against this subterranean work, the besieged usually established outside the moat a palisade o continuous wall, an actual covered way that commanded the approaches, and compelled the assailant to begin his mine shaft quite distant from the trench; then as a last resouece they countermined and sought to meet the gallery of the assailants; they r repulsed them, and suffocated them by throwing into the galleries burning fagots, aud destroyed their works. There exists

crossing a branch of the Nile, S. Louis had two towers built, that were called castles. "For they were two castles before the road and two houses behind to receive the blows that the Saracens gave with machines; of which they had sixteen all complete, with which they did wonders." [1] The assailant supported his towers and cats by batteries of casting machines, mangonels, stone-throwers, etc., and by crossbow men protected by ramparts or palisades terraced with hurdles and earth, or also by trenches, fascines and portable protections. These various engines (mangonels, stone-throwers, etc.) were moved by counterpoises, and they had a great accuracy of fire; [2] yet they could only destroy the battlements and prevent the besiegers from remaining on the walls or dismount their machines.

Note 1. p. 344. De Joinville, Hist. du roi saint Louis. Edit. 1668. Du Cange. p. 37. In his observations, p. 69, Du Cange explains this passage thus:-- "The king S. Louis then had two towers built of wood to protect those working on the road, a and these towers were called cat-castles, i.e. cati castellati, because above those cats were a sort of castles. For these w were not simple sheds like the cats, but structures defended by towers. S. Louis in the letter of his capture, speaking of this road, says:-- (See Latin text). And I believe that the lower story of these towers (castles) was for the use of the cats and for sheds, because of which the cats of that sort w were called cat-castles, i.e., as I have just stated, cats f fortified by castles. The author that described the siege of Zara by the Venetians in the year 1346(Book 1, Chap. 6 in John Lucian of the kingdom of Dalmatia) describes to us that species of cat:-- (See Latin text). And because these machines w were not simple cats, they were named false cats, that had t the form of towers, yet were for the use of cats. And thus should be understood this passage of Froissart. "The next day came two master engineers to the duke of Normandy, who said that if timber and workmen were furnished to them, they would build four "chaffeoux" (some copies have cats), that would be brought to the walls of the castle, and would be higher than the walls." From which comes the word "scaffold" among us, to denote a high elevated floor." See the Recueil de Bourgogne of M. Perard, p. 395.

Note 2. p. 344. See Etudes sur le passe et l'avenir de l'ar-

whistling, between the wall and the castle it advances with little jumps, like the hawk hunting little birds. Straight forward comes the stone launched by the engine, and it strikes with such a blow, the highest plank, that it breaks, splits and tears the hides and ropes. If you withdraw the cat," said the barons (to the count de Montfort), "you will make good t the blows. By God," said the count, "that is what we shall see immediately." And then the cat returns, it continues its little jumps. The engine is set, its cast is prepared, and it g gives such a blow the second time, that the iron and steel, the beams and pins are cut and broken." And further:-- "The count de Montfort has collected his knights, the most valiant during the siege and the most approved; he has made (for his cat) good defenses furnished with with irons on the front, and he has placed within his companies of knights, well covered by their armor and laced helmets; then the cat is strongly a and quickly pushed forward; but those in the city are well experienced; they have prepared and adjusted their machines, and have placed in the slings fine blocks of cut stone, when the cords are loosed, they fly rapidly and strike the cat so well on front and sides, its doors, floors, arches cut (in the timbers), that the pieces fly on all sides, and that tose pushing it are overturned, And in all the city rises a cry:-- "By God! Madame false cat will never catch rats!".[1]

Note 1. p. 343. Hist. de la croisade contre les heretiques albigeois, written in Provencal verses, published by M. C. F Fauriel. Coll. de docum. ined. sur l'hist. de France. 1 st s series, and the manuscripts of the Impl. Liby. (fonds La Valliere, No. 91). This manuscript is by a contemporary author, an eye-witness of most of the facts he relates; the accuracy of the details gives that work great interest; we call to the attention of our readers the description of the cat and of its passage by little jumps, "between the wall and the castle it come by jumps," that paints energetically the movement of those heavy works of carpentry advancing by jumps. To emphasize these details, he must have seen it.

William Guiart, in regard to the siege of Boves by Philip August, speaks thus of the cats:-- (See old French text).

And in the year 1205:-- (See old French text).

In order to protect the laborers building a road for cross-

mass, to adopt a system of fortification giving to the defense an activity equal to that of the attack, and requiring a more numerous garrison. It no longer sufficed (and the terrible S Simon de Montfort proved it) to possess thick walls, castles located on precipitous rocks, from the height of which men c could scorn an assailant without active means of attack, but it was necessary to defend these walls and towers and to furnish them with numerous soldiers, machines and projectiles, to baffle his efforts by combinations that he could not foresee, and to shelter them from surprise or sudden attacks; for often well equipped places fell into the power of a small and bold troop of men at arms, that passed the barriers over the bodies of the defenders, took possession of the gates, and t thus gave an army entrance to a city. Toward the end of the 12 th century and during the first half of the 13 th century, the means of attack and defense, as we have said, were perfected and particularly were conducted with more system. We then see in the armies and the places engineers particularly charged with the construction of engines intended for the attack or defense. Among these machines, some were defensive and offensive at the same time, i.e., were so constructed as to protect the pioneers and to batter the walls; the others were offensive alone. When scaling (the first means of attack that was almost always employed) did not succeed, when the gates were too strongly defended to be forced, it was necessary to undertake a regular siege; then the besieger constructed wooden towers on rollers, that were necessarily higher than the walls of the besieged place, also built cats, a sort of wooden structure covered by iron and skins, that were moved up to the foot of the wall, which permitted the assailants to work the battering ram (same as that of the ancients), or to undermine the tower or curtain by means of the pickaxe, or also to bring earth and fagots to fill the moat.

In the poem of the crusade against the Albigenses, Simon de Montfort often employed the cat, that not only appeared to be intended to allow undermining the wall under cover, but also to serve the purpose of the rolling tower by bringing a troop of soldiers to the level of the parapet. -- "The count de Montfort commands: -- Now push on the cat and you will take Toulouse -- and the French pushed the cat, while crying and whist-

while retaining their original names of Turkish engines or T Turkish stone-casters.[1]

Note 1. p. 341. "An evening came, that the Turks brought an engine, which they call the stone-thrower, a terrible machine for doing injury; and they placed it opposite the castle, where Walter de Curel and I watched at night. By this machine they threw the Greek fire, that was the most terrible that I ever saw. The nature of the Greek fire was such, that it came as large as a barrel, and the length of the tail of half a r reed of four paces. It made such a noise in coming, that it seemed like the thunder from the sky, and it seemed to me a great dragon flying through the air, and made such great light, as to make it clear as day in our place, it had such a great flame of fire. Three times in that night we received the said Greek fire from the said engine, and four times with the cross-bow in turn." Joinville. Hist. de S. Louis. Edit. Du Cange.1668.

One cannot doubt that the crusades, during which so many m memorable sieges were made, perfected the means of attack, and that consequently important modifications were made in the defenses of Paris. Until the 13 th century, the fortification is protected by its passive resistance, by the mass and location of its structures. It sufficed to place a weak garrison in towers and behind high and thick walls, to defy for a long time the efforts of assailants, that only possessed very weak means of attack. Norman castles, erected in such great numbers by these new conquerors in northeast France and in England, presented massive structures, that did not fear scaling because of their height, and that mining could subdue with difficulty. Besides, care was always taken to establish wherever possible these castles on elevated places, on a rocky crest, and to surround them with deep moats, so as to make the work of the miner impossible, and as a refuge in case of surprise or treason, the enclosure of the castle always contained an isolated keep commanding all its works, itself often surrounded by a moat and wall, and that could by its position and the height of its wall permit a few men to hold in check numerous assailants. But after the first crusades, when the feudal system had placed in the hands of some nobles power nearly equal to that of the king, it was necessary to renounce passive fortifications, that scarcely defended themselves except by their

garrisons, then attacked the body of the place. All the preliminary operations of sieges were long and uncertain; they e required considerable supplies of timber, projectiles and frequently works of contravallation, movable towers, fixed forts of timbers and machines hardly half finished, that a vigorous sortie of the besieged, or a night attack, destroyed the labor of several months by fire or the axe. To avoid these disasters, the besiegers established their lines of contravallation by means of rows of strong palisades of timber spaced the length of a pike (10 to 13 ft.), and excavating a ditch before them, used the earth to fill the spaces between the piles; they covered their machines, their fixed and movable towers with skins of oxen or horses, fresh or boiled, or with coarse woolen cloth, in order to photect them from incendiary projectiles. It often occurred that the parts changed, and that the assailants were repulsed by the sorties of the garrison, and forced to take refuge in their camp, becoming besieged in their turn. In all times the work of approach in sieges has been long and harassed by difficulties; but then much more than today, the besieged left their walls either to skirmish at the barriers and prevent permanent establishments, or to destroy the works erected by the assailants; armies guarded themselves badly, like all irregular and undisciplined troops; men trusted to the palisades to stop a bold enemy, and each one depending on his neighbor to guard the works, it often happened that a hundred men at arms leaviug the place in the middle of the night, suddenly penetrated ts the heart of the army without meeting a sentinel, set fire to the war machines, and cutting the cords of the tents to increase the disorder, retired before having the entire camp on their hands. In the chronicles of the 12 th, 13 th and 14 th centuries, these surprises were renewed at each instant, and the armies kept guard no better on the morrow. It was also frequently in the night, that men attempted by means of casting machines to burn the wooden works of the besiegers or of the besieged. The orientals possessed incendiary projectiles, that caused such great fear to western armies, which causes the supposition that these did not know their composition, at least during the crusades of the 12 th and 13 th centuries, and they had powerful machines, that differed from those of the western men, since the latter adopted

requires a greater enveloping force, and compels the assailant to execute larger and longer works; but when it is necessary to batter walls near them, when to destroy these works of the besieged one only employs the sap, battering ram, the mine or machines with short reach, when one can assault only by means of these wooden towers or by means of scaling, or again by b breaches badly made and of difficult access, the more the garrison is crowded into a narrow space, and the stronger it is, for the besiegers, however numerous, are obliged to come to hand to hand, can have at a given point only a force at most equal to that opposed to them by the besieged. On the contrary very extended enclosures can be abruptly attacked by a numerous army at several points at one time, dividing the forces of the besieged, requiring a garrison at least equal to the army of investment, to sufficiently man the ramparts, and to repulse attacks, that can be frequently foreseen only at the moment when they are executed.

To prepare against the inconveniences presented by great f fortified fronts, toward the end of the 12 th century men had the idea of establishing isolated fortresses before continuous enclosures flanked by towers, actual detached forts designed to keep the assailant far from the body of the place, and to force him to give to his lines of contravallation an extent, that it would require an immense army to hold. With modern artillery, the convergent fire of the besiegers gives a superiority over the divergent fire of the besieged; but before the invention of cannon, the attack could only be very close and always perpendicular to the defensive arrangement; there was then an advantage to the besieged to oppose to the assailant isolated points not commanding each other, but well defended; thus the forces of the enemy were scattered by compelling him to make simultaneous attacks on parts chosen by the besieged and consequently equipped. If the assailant left behind him detached forts to attack the fronts of the place, he must expect to have on his hands the garrisons of the detached forts at the moment of making an assault, and his position was bad. Sometimes to avoid forming a regular siege at each of these forts, the besieger with a numerous army erected forts of dry masonry, wood and earth, established lines of contravallation around the isolated fortresses, and shutting up their garris-

(9 bis) represents the attack on the palisades or barriers s surrounding a stone fortification; [1] there is perfectly distinguished the battering ram carried on two wheels and impelled by three men covering themselves with their shields; a fourth assailant holds a crossbow. [1] The second (9 ter) represents one of the visions of Ezekiel; three battering rams on wheels surround the prophet. [2] In the siege of the castle of Beaucaaire by the inhabitants of that city, the battering ram was employed. (See later the passage in which is the question of this machine). Finally in the Chronicles of Froissart, and l later still at the siege of Pavia under Francis I is a question of the battering ram. But after the first crusades, western engineers who had been in the East with the armies, made in France, Italy, England and Germany some improvements in t the art of fortification; the organized feudal system put into practice new methods, and improved them constantly because of its permanent condition of war. From the end of the 12 th century until about the middle of the 14 th, defense had the advantage over the attack, aud that situation changed only w when men employed gunpowder in artillery. Thenceforth the attack never ceased to be superior to the defense.

1. p. 337. Haimonts Comment. in Ezech. Bibl. Imp. Manuscript of the 10 th century, f. de Saint-Germain. Latin. 303.

1. p. 338. Bible No. 6. Vol. 3. Liby. Imp. Anc. F. Latin. M Manuscript of 10 th to 11 th centuries. We owe these two tracings to the courtesy of M. A. Darcel.

Note 2. p. 338. "Represents a siege in form against it, forts, banks of earth, an army surrounding it, and machines of war around its walls. Take also a plate of iron, and place it as a wall of iron between yourself and the city; then regard the city with a firm countenance," etc. (Ezekiel, Chap. 4, v verses 2, 3). Ezekiel in fact held the iron plate, and around him are the battering rams.

Until the 12 th century, it does not appear that cities were defended otherwise than by walls flanked by towers; this was the Roman method; but then the soil was already covered by c castles, and men knew by experience, that a castle defended itself better than a city. Indeed today one of the most common principles of fortification consists in opposing the greatest possible front to the enemy, because the greatest front requires a greater enveloping force, and compels the assailant

If from the 4 th to the 10 th centuries the defensive system of Roman fortification was little modified, the means of attack had necessarily lost their value; cambines played a great part in the sieges of places, and this art had been unable to perfect itself, or even to maintain itself under the domination of conquering barbarians at the level at which the Romans had placed it. The few documents remaining to us on the sieges of these epochs emphasize great inexperience on the part of assailants. It was further always difficult to hold irregular and badly disciplined armies before a city, that resisted some time, and if sieges were protracted in length, the assailants were almost certain to see their troops disband to pillage the country; then the defense led in the attack, and men did not take a city defended by good walls and a faithful garrison. But gradually the means of attack were perfected, or rather were pursued with a certain method; when one wished to invest a place, first were established two lines of ramparts of earth or of wood furnished with ditches, one next the place for protection from sorties of the besieged and to prevent their communication with the outside, which is the line of c contravallation; the other toward the country, to prevent external assistance, which is the line of circumvallation; Opposed to the towers of the ramparts attacked were higher movable wooden towers, that commanded the ramparts of the besieged, and which allowed the pouring of numerous assailants on the r ramparts by means of movable bridges. The movable towers had this advantage in being placed against the weak points of the defense, against curtains furnished with terraces of small w width, consequently opposing only one line of soldiers to a deep attacking column, descending from above to the walls. T The work of the miner was perfected, and all the engines for battering the walls; henceforth the attack had the better of the defense. Of war machines of the Romans, the armies of the first centuries of the middle ages had retained the battering ram. This fact has sometimes been placed in doubt, but we have proofs of the use during the 10 th, 11 th, 12 th , 14 th, 15 th and even the 16 th centuries, of this engine suitable for battering walls. Here are copies of vignettes taken from manuscripts of the Imperial Library, which cannot leave the least uncertainty concerning the use of the battering ram. The first

Roman period. When a bridge before the walls connected both banks of the river, then this bridge was protected by an outwork G at the side opposite the city; these assumed more or less importance; hey comprised entire suburbs or were little castles or merely barbicans. (Arts.Tete de pont).Barbican). Stockades and towersbuilt above at both sides of the river p permitted stoppage of the passage and the interruption of navigation by stretching between the towers chains or logs connected at the ends by iron rings. If as at Rome itself in the vicinity of a river, there was a series of hills, care was t taken not to enclose these hills, but to carry defensive walls over their summits, carefully fortifying the intervals, that were dominated by the walls at two sides, therefore could not be attacked without great risk. For this purpose the line of the walls was nearly always bent and curved between these hills, as indicated by the cavalier plan (8). [1] But if the city occupied a terrace (then generally of only little importance), men profited by all projections of the ground by following i its windings, so as not to permit besiegers to establish themselves on the level at the foot of the walls, as we can see at Langres and at Carcassonne, whose Visigothic enclosure is here given (9), or we may say Roman, since some of its towers were built on Roman foundations. In antique cities, as in most of those built during the middle ages, and is still the case today, the castle (castellum) [1] was built not only on the highest point, but also always adjoining a part of the enclosure, so as ts afford the garrison means of receiving aid from outside, if the city were taken. The entrance to the castle being protected by advanced works frequently extending quite far into the country, so as to leave a sort of free space between the first barriers and the walls of the castle, a kind of parade ground, that would permit a body of troops to camp outside the permanent enclosure and sustain the first attacks. These advanced entrenchments were generally erected in a semicircle c composed of ditches and palisades; the gates then being opened at the sides, so as to compel the enemy desiring to force them to present his flank before the walls of the place.

Note 1. p. 335 See the plan of Rome.

Note 1. p. 336. Capodhol = capitol in speech south of the Loire.

Note 1. p. 333. These towers were partly disfigured at the beginning of the 12 th century and after the taking of Carcassonne by the army of S. Louis. Yet are found at various points traces of these interruptions between the curtains and the d doorways of the towers.

Note 1. p. 334. This postern still exists beside a tower and protected by its side. (Art. Poterne).

Conformably to the tradition of the Roman permanent camp, t the walls of mediaeval cities comprised a castle, or at least a fort that commanded the walls; the castle itself contained an isolated defense stronger than all others, that took the name of keep. (Art. Donjon). Frequently the mediaeval cities were protected by several walls, or indeed the citadel located on the highest point was surrounded by strong walls, and around it were suburbs protected by towers and curtains, or by simple works of earth, of wood and ditches. When the Romans founded a city, they took care as much as possible to select a slope inclined along a river or stream. When the inclination of the ground ended in a precipice at the side opposite the stream, the site satisfied all desirable conditions; and to make this better understood by a sketch, here (7) is a cavalier plan of the site of a Roman city conforming to these requirements. A was the city with its walls bordered at one side by the river; frequently a bridge was defended by advanced w works and communicated with the opposite bank. At B was the steep slope rendering access to the city difficult at the place where a hostile army must attempt to invest it; D was the castle dominating the entire system of defense, the refuge of the garrison in case the city fell into the hands of the enemy. The weakest points were then the two sides C C, and there the walls were high, well flanked by towers and protected by wide and deep ditches. The position of the besiegers on these two fronts was further not very good, for a sortie taking them in flank, if the garrison were brave and numerous, might drive them into the river. With the purpose of seeing the arrangements of the besiegers, very tall towers were erected at the angles E E, which allowed them to see afar the shores of the river above and below, as well as the two fronts C C. According to these principles the cities of Autun, Cahors, Auxerre, Poitiers, Bordeaux, Perigueux, etc., were fortified in the R

earth according to William of Puilaurens, since Simon de Montfort caused the removal of all earth, that raised them up to the roof." [3]

Note 3. p. 331. Annales de la ville de Toulouse. Vol. 1. p. 436. Paris. 1771.

The Visigothic walls of the city of Carcassonne have retained similar arrangements, that recall those described by Vegetius. The ground of the city is much higher than that outside, and is nearly at the level of the ramparts. The curtain walls are very thick, and are composed of two walls of small cubical stones with alternating courses of bricks; the middle is not filled with earth, but with spalls laid in lime. The towers rise above the curtain walls, and their communication with t these can be cut off, so as to make each tower a little independent fort; on the exterior the towers are cylindrical and on the city side are square; their shafts also rest on square bases at the side toward the country. We give here (6) the p plan of one of these towers with the curtains. A is the plan of the ground story, B the plan of the second story at the l level of the terrace. At C and D are seen the two pits arranged before the doorways of the tower for intercepting communication between the city on the terrace and the stories of the towers, when the wooden bridges are removed. From the second story one reached the upper battlemented part of the tower by an internal wooden stairway placed beside the flat wall. The external ground being much lower than that of the city, the ground story of the tower was below the ground in the city, and one descended there by a stairway of 10 to 15 steps. T The Fig. (6 bis) shows the tower and its two curtains from the side next the city, the bridges of communication being removed. The upper battlemented story is covered by a roof, and is open next the city, so as to permit the defenders of the tower to see whatever passes, and also to permit them to hoist stones and all sorts of projectiles by means of a rope and pulley. [1] Fig. (6 ter) shows the same tover on the outer side; we have added there a postern, [1] whose threshold is sufficiently raised above the ground to require movable stairs or a ladder to reach it. According to custom, the postern is defended by a palisade or barrier, each gate or postern having this kind of works.

equipped with machines suitable for casting arrows or stones. The situation of the place often modified this rectangular a arrangement, for as Vitruvius judiciously observed concerning war machines (Chap. 22);-- "As to what means the besieged can employ to defend themselves, that cannot be written."

Note 1. p. 330. Codes. Stewechii. Conject. at Sexti Jul. F Frontini lib. Strategem. p. 465. Lugd. Batav. 1592.

The military station of Famars in Belgium (Forum Martis), g given in the Historie de l'Architecture en Belgique, and whose plan we reproduce here (4), presents an enclosure with an arrangement not related to the ordinary plans of Roman camps; it is true that this fortification cannot be earlier than the 3 rd century. [1] As for the method adopted by the Romans in the construction of their fortifications of cities, it consisted of two strong masonry walls separated by an interval of 20 ft.; the middle was filled with earth brought from the ditches and of rubble well tamped, forming a terrace slightly inclined to toward the city for removal of water; the external surface r rose above the terrace, was thick and had battlements; the internal one was a little elevated above the ground of the place, so as to render easy the access to the rampart by means of s steps. (5). [2]

Note 1.p. 331. Hist. de l'Arch. en Belg. by G. B. Schayes. Vol. 1. p. 203. (Brussels).

Note 2. p. 331. Vegetius. Book 4. Chap. 3, entitled "Quemodmodum muris terra jungatur egesta.

Castle Narbonnais of Toulouse, that plans such a great part in the history of that city from the rule of the Visigoths u until the 14 th century, appears to have been built according to ancient principles; it consists of "two great towers, one at the South and the other at the North, built of burned earth and pebbles with lime, the whole enclosed by great stones without mortar, but cramped by iron bars set in lead. The castle was raised above the ground by more than 30 ells, having toward the South two successive portals, two vaults of cut stone to the top; there were two other successive ones at the North and on Place du Salin. By the last of these portals one entered the city, whose ground had been raised more than 12 ft. There was seen a square tower between these two towers or platforms for defense; they were terraced and filled with ea-

pots on the tortoise, and the Roman soldiers hold flaming brands, and appear to wait until the tortoise has approached q quite to the rampart, to pass beneath the shields and burn t the fort. In their entrenched camps, the Romans, besides some advanced works built of wood, frequently placed along the ramparts wooden scaffolds, that served to receive machines intended to cast projectiles, or watch towers to detect the approach of the enemy. The reliefs of the Column of Trajan present numerous examples of these structures. (3). These camps were of two sorts; there were common camps or purely temporary lodgings, erected to protect halts during the course of the campaign, and that were only composed of a ditch of small depth and a row of palisades set on a slight bank; then the winter or permanent camps, that were protected by a wide and deep ditch, by a turfed rampart or one of stone flanked by towers; the whole was crowned by parapets with battlements or with p piles bound together by timbers or willow ties. The use of ro- round or square towers in the fixed enclosures of the Romans was general as Vegetius says:-- "The ancients found that the enclosure of a place must not be in the same continuous line, because of battering rams that too easily breach it; but by means of towers placed in the rampart sufficiently near each other, their walls present projecting and receding parts. If the enemy desired to use ladders or to bring up machines against a wall of that construction, he is seen from the front, side and almost rear; he is enclosed in the midst of fire from the place." From the highest antiquity the utility of towers was recognized as permitting the taking of besiegers in flankl when they would beat against the curtain walls.

Note 2. p. 328. These shields in form like parts of cylinders, were reserved for this species of attack.

The permanent camps of the Romans were generally erected w with four gates, opened in the middle of each side; the principal gate was called pretorian, because it opened before the pretorium, the residence of the general commanding; the opposite one was termed decuman; the two at the sides were called principal on right and left. Advanced works called antemuralia or procastria (before the walls or camp) defended these g gates.[1] The officers anf soldiers lodged in huts of earth, brick or wood, covered by thatch or tiles. The towers were e

customs, and their military establishments must have resembled fortified camps surrounded by palisades, moats and some banks of earth. Mud played a great part in the fortifications of the early times of the middle ages. And if these German races that occupied Gaul left to the Gallo-Romans the care of erecting churches, monasteries, palaces and public edifices, they must retain their military customs before the conquered peoples. The Romans themselves, when they made war on regions covered by forests like Germany and Gaul, often built ramparts of wood, a sort of cabins advanced outside of the camps, as may be seen in the reliefs of Trajan's Column.[1] From the epoch of Cesar, when the Celts could not hold the country, they placed their women, children and their most precious possessions under shelter from the attacks of the enemy behind fortifications made of earth, wood and stone. Cesar says in his Commentaries:-- "They use pieces of wood, straight for their entire length, placing them on the ground and parallel at a distance of 2 ft. apart, fix them transversely by trunks of trees, and fill the voids with earth. On this first layer they place a course of great pieces of stone, and when these are well joined, they lay a new series of logs arranged like the first, so that the rows of logs do not touch, but rest on the interposed courses of stones. The work is thus carried to a proper height. This construction, by the variety of its materials and being composed of wood and stone forming a regular surface is good for the service and the defense of places, for the stones composing it prevent the wood from burning, and the logs being about 40 ft. long, bonded in the thickness of the wall, can only be broken or damaged with great difficulty." [1]

Note 1. p. 328. Caes. Bell. Gall. Book 7. Chap. 23.

The Germans also erected ramparts of wood crowned by parapets of willow. The Column of Antonine at Rome gives us a curious example of this kind of country forts. (2). But it is only probable that these were works erected in haste. Here is s seen the attack of this fort by Roman soldiers. For the infantry to approach the rampart, they cover themselves by their shields and so form what is termed a tortoise; resting the ends of these shields against the rampart, they can undermine its base or set fire to it while sheltered from projectiles.[2] The besieged cast stones, wheels, swords, torches and fire p

and it is necessary to say, that from this twofold point of v view, the civil architecture of the French Renaissance shows itself very superior to that adopted in Italy. The great French architects of the 16 th century, Philibert Delorme, Pierre Lescot, Jean Bullant, knew how to connect with remarkable skill the old and good traditions of the preceding centuries w with the forms newly adopted. If they employed the antique o orders, and if they often believed that they imitated Roman arts, they respected in their edifices the needs of their time, and submitted to the conditions of the climate and of the materials. It was only under Louis XIV that civil architecture ceased to regard these laws, so natural and true, and produced like an abstract art acting by entirely conventional rules o outside the customs and habits of modern civilization. (Arts. Maison, Palais, Jardin).

ARCHITECTURE MILITAIRE. Military Architecture.

When the barbarians invaded Gaul, many cities still possessed their Gallo-Roman fortifications; those not provided with them hastened to erect some with the ruins of civil monuments. These enclosures were successively forced and repaired, were long the sole defense of cities, and it is probable that they were subject to regular and systematic arrangement, but they were constructed very differently according to the nature of the places, the materials, or after certain local traditions, that we cannot appreciate today, for from these enclosures r remain to us only ruins, foundations modified by successive additions.

During the 5 th century the Visigoths took possession of a great part of Gaul; their domination under Vallia extended f from Narbonnais to the Loire. Toulouse remained for EI years the capital of that kingdom, and during that time most cities of Septimania were fortified with great care, and had to submit to frequent sieges. Narbonne, Beziers, Agde, Carcassonne and Toulouse were surrounded by formidable ramparts, constructed after the Roman traditions of the late time, if one judges them by the important portions of the enclosures, that still surround the city of Carcassonne. The Visigoths, allies of t the Romans, only perpetuated the arts of the empire with a c certain success. As for the Franks, they had retained German

populous cities hemmed in by walls, more easily defended the smaller their perimeter. Thus the laws of symmetry, so ridiculously tyrannical in our days, never exerted their inflence on the people in the middle ages, especially in countries where Roman traditions were effaced. But when at the beginning of the 16 th century, the study of antiquity and of its monuments made known a great number of plans of Roman edifices, in which the laws of symmetry were observed; the feudal castles in which the structures seemed to be placed at random according to needs, near irregular enclosures; houses, palaces and public monuments erected in sites laid out by chance, appeared in the eyes of all as dwellings of barbarians. With the mobility characterizing the French spirit, men went to t the opposite excess and wished to employ symmetry even in the plans of edifices, that by their nature and the diversity of the needs to be satisfied, were not at all suited to it. A number of wealthy nobles caused residences to be erected for themselves, whose symmetrical plans pleased the eyes on paper, but were entirely inconvenient for daily occupation. The houses of the citizens longer retained their arrangement suited to the requirements, and it was only in the 17 th centurw, t that they also commenced to sacrifice these needs to the vain laws of symmetry. Once in that path, civil architecture daily lost its originality. From the entirety of the plans this fashion passed to the arrangement of facades, and to decoration; it was no longer possible for an edifice to be judged by its exterior for its contents. Architecture instead of being the judicious enclosure of different services composing a habitation, imposed its laws, or what it indeed desired to call its laws, on the internal arrangement; as if the first law in architecture was not absolute submission to needs! As if it were something outside these needs! As if the purely conventional forms adopted by them had sense, from the moment when they o obstructed instead of protecting! Yet the civil architecture of the Renaissance, especially at the moment when it was born and commenced to develop, ie., from 1500 to 1550, almost always retains its character of habitation or public establishment, so frankly emphasized during the Gothic period. The antique element brought little more than a decorative enclosure or a need of balancing into the arrangement of the plans; a

isolated services. It pertained to the political centralization, to the unity of monarchical power, to create real public establishments, no longer for any market town or any city, but for the country. We are not astonished therefore by not finding before the 16 th century these great monuments of general utility, that rose at the beginning of the 17 th century, and that form the true glory of the age of Louis XIV. The state of the country before that epoch did not admit of works conceived with grandeur, executed with regularity, and producing immense results. It was necessary that the unity of the power of the monarchy should not be contested in order to cut a canal across three or four provinces, each having its customs, prejudices and prilileges; to organize on the entire area of the territory a system of barracks for troops, hospitals for the sick, bridges, dykes of rivers, defense of posts against invasions of the sea. But if the country gained in well-being and in se security by the establishment of governmental unity, it must be admitted that art lost by it, while the feudal division was singularly suitable for its development. An official art is no longer an art, it is a formula, art disappears with the r responsibility of the artist.

Architecture, national, religious and monastic, was extinguished with the 15 th century, obscurely; civil architecture with feudalism, but giving a brilliant light. The Renaissance added nothing to religious architecture and only hastened its fall, but brought into civil architecture a new element sufficiently spirited to rejuvenate it. Until then in civil structures, no account of symmetry seemed to be taken, of the general arrangement of the plans. Several causes had diverted minds from observing the rules generally adopted by the ancients, as far as reasonable in the entirety of their buildings. The first was that type of Roman villa followed in the first feudal habitations; now the antique villa was a rural residence, and did not permit a symmetrical arrangement in its entirety; the second was the necessity, in habitations fortified most of the time, for profiting by the natural conditions of the site, the subordinating the position of the buildings to the needs of defense, to the different services that must be satisfied. The third was the excessive narrowness and irregularity of the sites afforded for private houses, particularly in

of reaction against feudal tendencies. (Art. Corporation).

Note 1. p. 323. Sauval. Vol. 1. p. 510 et seq.

The power of the guilds of tradesmen and of merchants, the rights and privileges enjoyed by them from the 12 th century, the monopolies that made them exclusive masters of industry, commerce and work; the organization of armies, which on the morrow after the wars left on the roads thousands of soldiers without pay or country, must have singularly developed these associations of vagabonds in permanent opposition to society. Houses of refuge founded by monks, bishops, kings and even simple private men to assuage misery and collect the poor, s scarcely sufficient in ordinary times, after the long disturbances and interminable wars, could not offer asylums to so mann unemployed hands, to men with the habit of pillage, degraded by misery, with neither family nor home. A long time was necessary to heal that social plague of organized pauperism, armed so to speak; for during the 16 th century the religious wars contributed to perpetuate this condition. It was only during the 17 th century, when the monarchy had acquired a power unknown before that by a unique police and establishments for aid broadly conceived, could be gradually extinguished these associations of misery and vice. In this spirit o our great hospitals were rebuilt to centralize a multitude of houses of refuge, hospitals, endowments, distributed in the great cities; that the central hospital of the Invalides was founded, that the Salpetriere was built, a house of confinement for the poor, as Sauval terms it.

The feudal division could not assist measures of general u utility; the feudal system is essentially egoistic; what it does is done for itself and its own, with the exclusion of t the generality. Monastic establishments themselves were permeated, up to a certain point with that exclusive spirit, for as we have said, they adhered to feudal customs as landed proprietors. The mendicant orders were trained in ideas entirely foreign to the custom of feudalism; but having become rich p possessors of good estates, they lost sight of the principle of their institution; separated and even rivals, they had ceased from the end of the 13 th century to cooperate in a common aim of general interest; not that they did not render important services, like their Benedictine predecessors, but these were

it was often necessahy to wander in the vile little streets, stinking and crooked; to enter there it was necessary to descend quite a large slope of ground, crooked, rough and irregular. I have seen a house of mud, half buried, all tottering from age and decay, not four fathoms (25 ft.) square, that h however lodged more than fifty families, with an infinity of children, legitimate, natural and stolen. I was assured that in that little dwelling and in the others dwelt more than five hundred great families heaped above each other. However large that court is at present, it was formerly much more so; on o one side it extended to the ancient ramparts, now called Rue S. Sauveur; at the other it covered a part of the convent of Filles-Dieu (Daughters of God), before it passed to the order of Fontevrault; on the other it was bordered by the houses allowed to fall into ruin, and now made into gardens; in all p parts it was surrounded by low houses, dark, deformed, made of earth and mud, and all filled with evil poor. When in 1630, the moats and ramparts of gate S. Denis were extended to where we now see them, the commission delegated to conduct this undertaking resolved to cross the court of Miracles with a street, tha should ascend from Rue S. Sauveur to Rue Neuve S. Sauveur; but whatever they could do, they found it impossible to succeed; the masons that commenced the street were beaten by the rascals, and these scoundrels threatened with worse t things the contractors and the foremen of the work." These co collections of thieves, of vagrant persons, of broken soldiers, was still subject in the 16 th and 17 th centuries to a sort of secret government, that had its officers and laws, that h held regular chapters in which the interests of the republic were discussed and instructions were given to the different provinces; this population of vagabonds had a special language, a king that took the name of the Grand Coesre (Cesar ?) and f formed the great congregation of users of slang, divided into Cagoux, Archisuppots of Argot, Orphelins, Marcandiers, Rifodes, Malingreux and Gapons, Pietres, Polissons, Francmitoux, Calots, Sabouleux, Hubins, Coquillarts, Courteaux de Boutanche, and Narquois. Thus everywhere in the middle ages, for the good as for the bad, the spirit of combination appeared, and declassed men that could find no place in the regular associations, even obeyed that great movement of the people toward unity.

particularly in the suburbs, inns,really furnished rooms, received strangers, scholars, adventurers, jugglers, and all persons without fixed abodes. There one found a lodging by the day, week or month. From these houses with bad fame for the most part came in troublous times these crowds of vagrant persons, who filled the streets, and gave much work for the police, municipal, royal or feudal. There the factions, that opposed the power, went to recruit their adherents. The university contained a great number of these furnished rooms from the 12 th century, and it was in great part to prevent the a abuses and disorders, that were the result of such a state of things, that many monastic establishments and bishops founded on the hill of S. Genevieve colleges, within whose enclosures the youths found both instruction and regular dwellings subject to a semi-clerical management. The cloisters of the cathedrals had preceded these establishments, and behind their w walls professors and scholars could find an asylum. Abelard rented a lodging from canon Fulbert in the cloister of Notre Dame.

But it is certain that in the great cities, at an epoch when the classes of society were so distinct, there should be found a number of persons, who were neither noble, religious, hired soldiers, merchants, artizans, scholars or laborers, that formed a mass of vagabonds, living somewhere; a sort of scum that no power could cause to disappear, even filling the cities when long public misfortunes had dried the sources of labor, and reduced to misery a great number of poor people. After the sad wars of the end of the 14 th century and the b beginning of the 15 th, there was formed at Paris an organization of rascals, which had branches in all the great cities of the realm. That company occupied certain quarters of the c capital; court of king Francis near Ponceau; court S. Catherine, street de la Mortellerie, court Brisset, court Gentien, part of street Montmartre, court de la Jussienne, part of street S. Honore, some streets of suburb S. Germain and S. Monceau, and hill of S. Roch. But the principal seat of that rascaldom was the court of Miracles. Sauval says:-- "It consists of a place of very considerable area and a very large blind alley, stinking, mouldy, irregular and not paved. Formerly it was confined to the extreme limits of Paris. To reach this,

in the wing on the court were the kitchen and its dependencies with its winding stairs built in a corner. In the third story were bedrooms only reached by the winding stairs from the court, ascending from the ground; for the straight stairway open to the street only gave access to the hall to which strangers were admitted. Under the roofs were garrets for the servants, clerks or apprentices; storerooms for provisions. The private winding stairs descended into the cellars of the master, which almost always were excavated under the kitchens in the wing, not being in communication with the cellars belonging to each shop. In the court a well, a shed at the rear for firewood, sometimes a stable and a bakehouse. These houses did not have a gable next the street, but indeed the eave of the roof, which especially in southern cities projected, supported on the ends of the rafters maintaned by pamds. The bottoms of the r rafters and the facades, particularly when of wood, received paintings. As for the house of the small citizen, it had no private court, and presented its gable to the street, especially after the 14 th century; it was composed in the ground s story alone of a shop and a passage leading to a straight stairway and communicating with the hall occupying the entire second storw. The kitchen was near the hall, looking on a common court and forming an open woodshed in the ground story, or even sometimes in the hall itself. The upper stories were reached by a private stairway, often corbelled out in the common court. Thus with the citizen as with the noble, the private was always carefully separated from the public life. In the palace, the porticos, great hall and guard hall were accessible to invited guests; in the house, these were the shop and the hall of the second storw; all the remainder of the lodging was reserved for the family; strangers entered there only in particular cases.

In the cities each family possessed its house. The citizens were not then divided as now into owners, renters, merchants, artizans, artists, etc.; they comprised only dealers and tradesmen. All men devoted to the permanent military condition found themselves attached to some nobleman, and lived in his feudal domain. All merchant clerks, apprentices and workmen lived with their masters. There were no rented buildings in the present sense of the word. In the great cities, and part-

century is logical first of all, consequently it must assume very different forms in religious and in private edifices, s since the primary principles are dissimilar. If architecture applied to religious edifices varies from its principles about the 15 th century, if it is loaded with superfluous details, that end in suppressing the general and very wisely combined principles of construction, on the contrary in civil edifices it follows the ascending course of civilization, and ends in the 16 th century by producing works, that if not always irreproachable with regard to taste, are very remarkable as general arrangements, by satisfying new requirements with rare s skill and good fortune. As well as may be judged from the examination of the civil structures, that remain to us from the 12 th, 13 th and 14 th centuries, the general principles of the palaces as of the houses were simple. The princely residence is composed of courts surrounded by porticos, stables, l lodgings of servants and of guests, outside the walls of the palace. The residence buildings always comprise a great hall with easy access. There the vassals gathered, when festivals or banquets were given, where affairs were treated that required a large assemblage of people, and where justice was administered. In the vicinity were prisons, a guard room; then kitchens and offices with their court and private entrance. The lodgings of the masters were often connected to the great hall by a parlor and a gallery, there were deposited arms, articles by conquest, precious furniture, often spoils torn from less fortunate neighbors. Paintings and portraits ornamented the gallery. The chambers intended for private use were grouped irregularly, according to need; as accessories, cabinets or r retreats were sometimes corbelled out or taken at the cost of the thickness of the walls. These lodgings were in several s stories, and communication between them was established by m means of winding stairs with access by turns known only to i intimates. The influence of the feudal domain, of the fortress affected these structures, that further on the exterior always presented a fortified appearance. The house of the rich citizen had a court and a building on the street. In the ground story were shops, a carriage entrance and a passage leading to a straight stairway. In the second story the hall, a place of assemblage of the family for meals and to receive guests.

intended to receive them. In great mansions the services and kitchens are separate from the principal building; a corridor corbelled out along one wall of the court connects in the second story these rooms with the apartments of the masters; th this projection forms a useful shelter in the ground story, that does not infringe on the area of the court. To light the attics, large visible dormers are either of stone or wood. C Chimney caps are visible, substantial, even frequently ornamented, pierce the roofs, their junction with the roof being protected by wide inclined strips. (Better flashed). Each shop has its cellar with private stairs and its storeroom in the rear. If the house has a carriage entrance, a smaller doorway is opened beside it for night service and persons on foot. C certainly it is far from that house to our houses of brick is imitating stone, to our wooden framework covered with plaster, our stairways that cross windows at the middle, our windows as wide for little rooms as for large ones, our chimney caps ashamed to allow themselves to be seen, that perpetual disguising of what is and what should be in our private residences, in which plaster is painted like marble or wood, wood is painted like stone, or the poorest construction is concealed under a covering of luxury. To make a Gothic structure, it then does not mean to throw on a facade some ornaments pillaged from old palaces, to place tracery in windows, but first of all to be truthful in the use of materials, as in the application of f forms to needs. Thus to cite only one example, if pointed windows are employed in the construction of churches or great v vaulted halls, that is perfectly justified by the side arches of vaults, that being themselves pointed, determine the form of the opening intended to introduce light into the interior; but in habitations with stories separated by horizontal floors, the use of the pointed window would be ridiculous and without reason, so you always see windows of dwellings spanned by lintels or by segmentat arches of small rise. If exceptionally the windows are pointed, a lintel of small thickness of a transom set at the springiug of the pointed arch permits the p placing of rectangular sash in the lower part, all that will be opened, and the upper part of the window between the curves is stationary.

Pointed architecture, born about the end of the 12 th cent-

archaeological architects of our time, who desire only to see the external form without seeking the principle, that directd our old artists of the middle ages. Properly speaking, there are no absolute rules for the application of certain forms, no rules other than the rigorous adherence to a principle, w with the power for each one to move within the limits fixed by that principle. Now that principle is this; to make every need and every means of construction evident. If the habitation be of brick, wood or stone, its form and appearance are the result of the use of these different materials. If one has a need for opening large or small windows, the facades show wide or narrow openings, long or short ones. Are there vaults in the interior, buttresses emphasize them on the exterior; are these floors, the buttresses disappear and mands mark the place of the joists. If one employs hollow tiles for covering, the roofs are low; flat tiles or slates, the roofs are steeper. If a great hall be necessary, it is lighted by a series of arches or by a glazed arcade. If the stories are divided into small rooms, the openings are separated by piers. If a fireplace be needed on a front wall, its flue is frankly accented by corbelling on the exterior, and extends through all stories to t the roof. If a stairway is required, it is placed outside the building, where it is contained within its own walls, the windows that light it indicate the landings, always arranging t the heights of their sills from the levels of the landings. In the interior, the joists of the floors and their framing are visible, simply squared if the house be modest, moulded a and even sculptured if the construction is luxurious. The doors of the rooms are opened where they cannot obstruct passage and placing the furniture, they are low, for one does not enter on horseback into his chamber or salon. If the rooms are high and spacious, the windows are wide and high, but the upper part is fixed, the lower portion alone opening readily, permitting the renewal of the air for one to go to the window without being disturbed by the wind; the blinds themselves are divided in sections to allow more or less light to enter. All is foreseen, the mullions are enlarged to receive the bolts, the transom bars with slight projections to receive the pivots. If one desires to place cloth blinds before the windows or before shops, stone corbels with indented projections are inten-

Canal, Route). It must be said that private architecture follows step by step the monastic principles until the 13 th century:-- 1, because the religious establishments were at the head of civilization, so that they had retained the antique traditions while applying them to [redacted], because the monks alone practised the art of architecture, as also sculpture and painting, and that they must consequently apply their formulas as well as the general principles of their buildings, even in structures foreign to monasteries. Palaces like monasteries possessed their cloister or court surrounded by porticos, their great hall took the place of the refectory of the monks, with their vast kitchens, dormitories for courtiers, a separate lodging for the lord as for the bishop or abbot; their inn for strangers, chapel, cellars, granaries, gardens, etc. Only that on the exterior the secular palace was protected by high fortified walls, towers and defenses much more i important and extensive than those of abbeys. The royal palace at Paris on the island contained the various services and dependencies from before Philip August. As for the houses of r rich citizens, even during the Romanesque period they had acquired great importance in both extent and decoration, and they followed the movement imparted by Benedictine architecture, rich in sculpture in the provinces, where Cluniac influence made itself felt, simple in the vicinity of Cistersian establishments. But at the end of the 12 th century, when architecture was practised by laymen, private habitations rejected their monastic clothing and assumed an appearance suitable to themselves. What characterizes them is a great sobriety in external ornamentation, a complete consideration of the needs. Rationalism at that epoch was attached even to religious structures, and for a still stronger reason was applied to private structures. But it is unnecessary to believe that this tendency led civil architecture into a narrow path, that this causet it to adopt dry and invariable principles, transfers like those in our days applied ts certain structures of public utilitw in spite of materials, climate, customs or traditions of a province. On the contrary, what distinguishes the rationalism of the 12 th and 13 th centuries from our own is a great firmness of principles, freedom, originality, and aversion to vulgarity. This freedom is such as to greatly embarras the ar-

with shed roof, so that the rain might not interrupt commerce. The building of Philip August contained two halls, and the w wall surrounding them was furnished with stalls. [1] Under S. Louis there were two halls for cloths, and another between t them with a shed roof. To state that these cloth halls are the same that Philip August had built, is what I do not know. As for the shed and the third hall, stalls were constructed there, like those of Philip; the king owned them and let them for s seventy-five livres to mercers and curriers. In time the hall became so large and so many others were built, that the merchants and artizans of Paris of all vocations had a part, so much so that then instead of using the word hall as singular, they continued to use the plural and to say halls. Sometime later, those of Beauvais, Pontoise, Lagny, Gonesse, S. Denis and other cities in the suburbs of Paris had them also. The same were built for most cities of Pacardy, Netherlands, and for some of Normandy, that our kings after the example of S. louis rented to the inhabitants of those cities in those provinces."[2]

Note 2. p. 317. Hist. de la ville de Paris, by D. Felibien. Vol. 1. p. 103.

Note 1. p. 318. The same. Vol. 1. p. 204.

Note 2. p. 318. Hist. et antiq. de la ville de Paris. Sauval. Vol. 1. p. 648.

These halls at Paris as in all the great cities were successively modified and enlarged to satisfy the new needs, and today there remain to us only the ruins of these public edifices in some cities of the second or third order. Besides that wood played a great part in these structures; this was where the sheds or great halls struggle resembled the barns of monasteries, that were not built to remain intact in the midst of c cities, which were made more beautiful daily. Yet in the cities of the North, in those little manufacturing republics of Netherlands, as we have already stated, they built splendid halls during the 13 th, 14 th and 15 th centuries, which have been preserved untel our days. (Art. Halle).

Ar for civil structures such as bridges, quays, sewers, canals, roads, we refer our readers to these words, both for the historical and the practical part; we shall limit ourselves here to some general requirements for urban habitations, whether of the nobles or citizens. (Arts. Pont, Egout, Quai, ca-

Philip VI of Valois then reigning, the cemetery of Holy Innocents was entirely closed and shut against the entrance of a any one, the gates and entrance being walled up for the benefit of the people, for fear that the air in Paris might be s spoiled and corrupted by reason of the mortality or epidemic then existing, and by the great multitude of bodies to be interred then in the said cemetery, and that might be brought there, there might occur great inconvenience and danger. And according to the will of the king another cemetery was consecrated outside the walls of the city, to inter all the bodies of those dying of the said epidemic; according to which ordinance several bodies were taken there. (I think that this may be that of the Trinity for those outside of the city, or again for the time when were interred the bodies of all dying of the contagion, taken from the Maison-Dieu (hospital) of Paris.[1] (Art. Cimitiere).

Note 1. p. 317. Antiq. de la ville de Paris. Du Breuil. Bk.3.

But those arylums, hospitals, and these fields for repose s surrounded by porticos, resembled monastic structures in all points until the 14 th cemetery, and were merely a branch of them, so to speak. The great abbeys had given the first models of these structures, they had earlier entered into purely civil architecture by devoting part of their lands to fairs, p perpetual or temporary markets; markets that became a result of a certain importance in the vicinity of the great centres of population. The knights of the Temple at Paris built a market on their territory, where they exercised justice, high, medium and low.[2] Philip August was one of the first, who occupied himself seriously and with that spirit of order that characterized him, with the extension and sanitation of the citw of Paris, purchased from the leper hospital established outside the city of Paris a market, that he transferred "into a great open area within reach of traffic, called Champeaux, i.e., little fields, already devoted to the use of the public by his grandfather, Louis VI. There he caused to be built halls for the accommodation of the merchants. He further provided f for the safety of their goods by a wall of stone, that he caused to be built around the halls, with gates that were shut at night. And between that enclosing wall and the houses of the merchants, he had constructed a sort of covered gallery

days; and to do so, to furnish with linen and coverings fifteen great beds, that are in two large and low halls of the said hospital, and the said nuns have the care of feeding, t treating and warming them with charcoal, when the season requires. Sometimes the beds are so full, that some of the said women and girls are compelled to lie between the two doors of the house, where they are shut in for fear they might do evil, or that no inconvenience might come to them in the night. Further they are required to collect in the said house all the bodies of those dying in the prison, in the river or city, a and also those who have been killed by the said city. Which are most frequently brought entirely nude, yet they wrap them in linen and shrouds at their expense, pay the grave-digger and have them interred in the cemetery of the Holy Innocents. Which sometimes are in such great number, that it is found by a document signed by the recorders of justice, there have been brought into the said house in less than fourteen months ninety eight dead bodies." [1]

Note 1. p. 316. Antiq. de la ville de Paris. Du Breuil. BK 3.

From the most ancient time and conformably to Christian customs, the dead were interred around the churches, unless they were heretics, Jews or excommunicated persons. Great personages had their graves even under the pavement of churches or cloisters; but in populous cities, the churches were frequently so surrounded by private dwellings, that it was not possible to reserve a space suitable for burials, for the establishment of charnel houses or special cemeteries near some churches, outside which were then reserved vast free areas. Such w were the cemeteries of Holy Innocents at Paris, of S. Denis at Amiens, etc. When the municipal government began to be established in the great cities, there were taken in the 13 th and 14 th centuries mearures for sanitation and city policing, the fields of the dead were enclosed by porticos, forming vast cloisters beneath which were erected monuments inteuded to p perpetuate the memorw of nobles or important personages, but soon when epidemics occurred, they recognized the inadequacy and danger of this enclosure comprised within the walls of g great cities, and outside the walls were established cemeteries, quite similar to those now devoted to burials.

"About Lent in 1348, by virtue of letters patent of king P

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From the most ancient time and conformably to Christian customs, the dead were interred around the churches, unless they were heretics, Jews or excommunicated persons. Great personages had their graves even under the pavement of churches or cloisters; but in populous cities, the churches were frequently so surrounded by private dwellings, that it was not possible to reserve a space suitable for burials, for the establishment of charnel houses or special cemeteries near some churches, outside which were then reserved vast free areas. Such w were the cemeteries of Holy Innocents at Paris, of S. Denis at Amiens, etc. When the municipal government began to be established in the great cities, there were taken in the 13 th and 14 th centuries mearures for sanitation and city policing, the fields of the dead were enclosed by porticos, forming vast cloisters beneath which were erected monuments inteuded to p perpetuate the memorw of nobles or important personages, but soon when epidemics occurred, they recognized the inadequacy and danger of this enclosure comprised within the walls of g great cities, and outside the walls were established cemeteries, quite similar to those now devoted to burials.

"About Lent in 1348, by virtue of letters patent of king P

considerable expenses. The wars with the East had introduced luxury in the West. Many monasteries and castles had established in their vicinity leper and other hospitals, that were only small hospitals maintained by the religious. Augustine friars (hospitalers) were particularly devoted to the service of the sick poor, and from the 12 th century a great number of hospitals in the great cities were served by the Augustine religious. Simple private persons, "moved by compassion," as Father Du Breuil says, "opened their houses to the sick poor" passing through the city;" they endowed them, and soon these houses were enriched by gifts, were granted prilileges by the bishops, the secular princes and the Popes, becoming great e establishments, which have remained until our days, respected by all powers and through all revolutions. But from the 12 th century hospitals were built according to a fixed programme. They were great vaulted halls, lofty, ventilated, often divided by one or several rows of columns; at one end was a vestibule, or sometimes a simple porch or shed; at the other being a chapel. In a wing was an office or pharmacy, then the cells of the religious or nuns, their refectory and kitchen; frequently a cloister and a church completed that group of buildings almost always surrounded by a wall.(Arts. Hotel-Dieu, M Maladerie, Leprosie). Gardens were attached to the establishment, when this could be done.

These houses in certain cases not only served as refuges for the sick, but also for the homeless poor. We read in the work of Father Du Breuil this passage concerning hospital S. Catherine, originally S. Opportune, founded in Rue S. Denis at P- Paris. "It is to be noted, that at the said hospital are eleven nuns, who live and keep the rule of S. Augustine, which at their profession they swear to keep, and are subject to the bishop of Paris, who visits them himself and by his vicars, make their profession in his hands, and has established and confirmed their statutes. Further they make the three religious vows, and live like the other reformed houses, except that they are not cloistered nor enclosed because of the hospital service, and that they are ordinarily among the poor, which they are bound to consider. They eat in common. The said nuns are required and held to receive all poor women and their girls for each night, and to feed them for three consecutive

Thus one of the means that the ecclesiastical power employed to obstruct the exercise of the rights of the commune, was to forbid a gathering in the churches for any motive other than prayer, or to sound the bells at any hour other than those of the offices." 1 The incessant contests of the communes of the royal domain with the feudal power during the 12 th century, and their quick decadence when the royal power was formed on a durable basis at the beginning of the 13 th century, did n not permit such cities as Noyes, Mans, Laon, Sens, Rheims, C Cambrai, Amiens, Soissons, etc., to erect great municipal structures other than defensive walls and belfries. The belfry was the most evident sign of the establishment of the commune, the signal that announced to the citizens the opening of popular assemblies, or the dangers to which the city was exposed. (Art. Beffroi). But the communes of Flanders, of Brabant in the south of France, that retained their functions until the 16 th century, had leisure to erect great municipal edifices from the end of the 12 th century, and especially during the 13 th and 14 th centuries. Several of these edifices still e exist in Belgium; but in the south of France, they were all destroyed during the religious wars of the 16 th century. We know of but one still standing in S. Antonin, one of the little cities of the county of Toulouse, located at some leagues northeast of Montauban. (Art. Hotel de Ville). It is the same with the halls and exchanges; we still possess in France only a very small number of these edifices, and yet they are only preserved in cities of little importance, while in Belgium t the cities of Bruges, Ypres, Louvain, Mechlin, Antwerp, have had the good sense to preserve from destruction these precious remains of their grandeur during the 13 th and 15 th centuries. (Art. Bourse).

Note 1. p. 314. Lettres sur l'histoire de France, by Aug. Thierry. Letter 13. 1842.

Note 1. p. 315. The same. Letter 20.

During the 11 th, 12 th, 13 th and 14 th centuries, a great number of hospitals were founded. The bishops and the religious establishments were first to offer an assured asylum and support to the sick poor. Pestilences were frequent in the m middle ages in cities without pavements, enclosed within the walls of less extent, because their construction caused cons-

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the new communes were able to acquire a preponderance sufficiently great, establish an organism complete enough to dream of building city halls, exchanges or markets. Indeed in the history of these communes, so well known today by the labors of M. Augustin Thierry, there is no question of the foundation of edifices of some importance. The enfranchised citizens of Vezelay erected fortified houses, but do not seem to have thought of establishing in their city the Roman curia, the city hall of the middle ages. "The inhabitants of the cities, that this political movement had gained, gathered in the great church, or on the market place, and there took an oath on the s sacred relics to support each other, to not permit any one to wrong them or henceforth treat them as serfs. All those joined together in that manner then took the name of communists or sworn man, and for them these new titles comprised the ideas of duty, fidelity and of reciprocal devotion, expressed in a antiquity by the word citizen. [1] Charged with the laborious task of being at the head of the people in the contest it undertook against its ancient lords, the new magistrates (consuls in the cities of the South, sworn or aldermen in those of the North) had the mission of assembling the citizens at the sound of the bell, and of leading them in arms under the banner of the commune. In this passage from the degenerate ancient civilization to a new and original civilization, the remains of the ancient monuments of Roman splendor sometimes served as materials for the construction of walls and towers, t that must protect the free cities from the hostility of the castles. One can still see in the walls of Arles a great number of stones covered with sculptures and furnished by the d demolition of a magnifiment theatre, but made useless by the change in customs and by the lapse of recollections."Thus at the origin of these great contests, the church served as a p place of gathering, and the first act of power was always the erection of walls destined to protect the conquered liberties. When the inhabitants of Rheims formed a commune about 1138, t the great council of the citizens assembled in church S. Symphorion, and the bell of the tower of that church served as a communal belfry. "Other cities presented at the same epoch an example of that custom introduced by necessity, for lack of areas large enough to place under cover a numerous assembly.

underground and the addition of one or two stories over the g ground story must be the consequences of that condensation of the urban population, at least in certain localities. "In the great cities Roman buildings had been preserved however; the curias, circuses, theatres and baths were still utilized under the kings of the first race; the sports of the circus did not cease abruptly with the end of Roman government; the new conquerors even prided themselves on retaining customs established by an advanced civilization; and such was the influence of the administration of the Roman empire, that it survived the long disasters of the 5 th and 6 th centuries. In the cities of the South and of Aquitaine in particular, less ravaged by the passage of barbarians, the forms of the Roman municipality were maintained; many public edifices remained standing; but North of the Loire the cities and the country were unceasingly devastated, and no longer offered a single Roman edifice, that could serve for shelter; the Frankish kings built villas an coarse masonry and wood; the bishops erected churches and monasteries; as for the city, it possessed no important public edifices, or at least no traces of one remain in history or on the ground. The villas of the country, the sole edifices, that in the Carlovingian epoch may have had some value, rather resembled great farms than palaces; they vere described in t the capitualry of Charlemagne (de Villis); the soil of Belgium, Soissons, Picardy, Normandy, Ile de France, Orleanais, T Touraine and Anjou was covered by them. The villas nearly always compsised vast courts with the buildings in the vicinity, single in depth and having a ground story; the different halls were reached by open porticos; one of the courts was reserved for nobles, called the urban villa; the others for colonists or slaves charged with the labor and called the rustic villa.[1] The Merovingian villa is then the transition between the Roman villa and the monastery of the Carlovingian epoch. (Arts. Architecture, Architecture Monastique).

Note 1. p. 313. M. de Coumont. p. 14 et seq.

After Charlemagne, feudalism soon changed the feudal villa into a strong castle. Monasteries alone retained the Roman t tradition. As for the cities, they only commenced to erect civil edifices after the great movement of the communes in the 11 th and 12 th centuries. A considerable time elapsed before

and enslaved, destroy the noble affection by which freely tending to virtue, casting off and freeing themselves from this yoke of servitude. For we always undertake forbidden things, and desire what is denied. So nobly taught, that among them will be only those, that can read, write, sing, play on harmonious instruments, speak in five or six languages, and in t them compose a poem or a prayer." The entire history of the first time of the Renaissance is in these few words, and one knows where that easy and courteous morality led society, and why so many persons, "well born, well educated, were impelled by nature to act virtuously."

In this Article, already very long, we have had to occupy ourselves only with the general requirements of monasteries, and we refer our readers to the study of the different services and buildings composing them to the Arts:-- Architecture Religieuse, Eglise, Cloitre, Grange, Porte, Clocher, Tour, Enceinte, etc. etc. [1]

Note 1. p. 312. See L'Abecedaire, or rudim. d'archaeol., a arch civile et militaire, by M. de Caumont. 1853.

ARCHITECTURE CIVILE. Civil Architecture.

There exists in France only very rare remains of civil edifices preceding the 13 th century. The habitations of the new masters of Gaul much resembled the Roman villas until the feudal epoch: they were groups of structures arranged on slopes almost always toward the south, without symmetry and surrounded by palisades or ditches. The residences of the great differed little during the Merovingian period from the religious establishments, that only perpetuated the antique tradition. M. de Caumont says:-- "When the Gallo-Roman cities, disturbed and then pillaged by the barbarians, were obliged to restrict their perimeters, to limit to points most favorable for defense; when the danger became so pressing, that it was necessary to sacrifice the most beautiful edifices, to demolish them to form with these materials the foundations of defensive walls, of those walls still presented by Sens, Mans, Angers, Bourges, Langres and most Gallo-Roman cities, it was then necessary to compress the houses massed in such narrow enclosures, compared to the primitive extent of the cities; the arrangement must experience considerable modifications; the vaulted halls und-

spirting water from their breasts, mouths, ears, eyes and other openings of the body. The interior of the building on the said low court is on great pillars of cassidoine and porphyry with beautiful antique arches, within which are long and wide galeries, decorated bw paintings, horns of stags, unicorns, rhinoceroses, hippopotamoses, elepthants' teeth and other interesting things. The lodgings of the ladeas extends from the t tower Artice to the portal Mesembrine. The men occupy the rest. Before the said lodgings of the ladies, that they may have d diversions, between the two first towers outside are a tiltyard, hippodrome, theatre and swimming pools, with wonderful baths with triple sun rooms, well supplied with all things a and abundance of water of myrrh. Next the river the beautiful pleasure garden. Inthe midst of this the fine labyrinth. Between the two other towers the games of hand ball and large b ball. From the side of the tower Cryere is the orchard, full of all fruit trees, all arranged in quimcunx order. At the e end is the great park abounding in all wild animals. Between third towers are the butts for arquebuses, bows and crossbows. The offices are outside the tower Hesperia in one story. The stable beyond the offices. The falconry before them, managed by falconers very expert in the art. And there are usually s supplied by Cretans, Venetians and Poles all sorts of singular birds, eagles, gerfalcons, goshawks, shrikes, falcons, sparrow hawks, merlins and others, all well trained and domesticated, that leaving the chateaux to hunt in the fields, take all that they meet. The kennel is a little farther off, toward the park.

All the halls, chambers and cabinets, are hung in various ways, according to the seasons of the year. The entire floors are covered by green cloth. The curtains are of embroidery.

In each rear chamber is a mirror of crystal framed in fine gold, ornamented around by pearls, and of such size that it can actually exhibit the entire person."

The rule of the Thelemites is limited to this clause:--

"Do what you will," adds Rabelais, "because free persons, well born, well educated, conversing in good company, have by nature an instinct and motive, that always impels them to act virtuously and retire from vice, which they call honor. Those, when by vile subjection and constraint are degraded a

°ext it one of the towers is placed named Artice. And passing toward the east another is named Calaer- the others succeding are Anatole, Mesembrine, hesperia, and the last is Cryere. Between each two towers is a space of 312 ft. The whole is built six stories high, taking the cellars underground as one. The second is vaulted in oval form. The rest are separated by Flanders ceilings in the form of ribbed domes. The roof covered with fine slates, with lead cresting in figures of little mannekins and animals well arranged and gilded, with spouts extending from the wall between the windows, painted in diagonal forms in gold and blue, down to the ground, where they terminate in great sewers carryiug all under the building to the r river.

The said structure is a hundred times more magnificent than is Bonivet, Chambord or Chantilly, for in it will be 9,332 c chambers, each having a rear chamber, dressing room, wardrobe, chapel and entrance to a great hall. Between the towers in t the middle of the said main building will be a winding stairway with landings in the same structure. Of which the steps will be partly of porphyry, partly of Numidian marble, partly of serpentine marble, and 22 ft. long; the thickness will be three fingers, the risers numbering 12 between each landing. Between each two landings will be two beautiful antique arches by which light is received; and by it one enters a cabinet opening the width of the said stairs, and ascends above the roof, there terminating in a pavilion. Then one euters from each side a great hall from the chambers. From the tower Artice to the tower Cryere are beautiful large libraries in Greek, Latin, Hebrew, French, Tuscan and Spanish, separated in different stories according to the languages. In the middle is a marvellous winding stairway, to which the entrance is from outside the building by an arch 38 ft. wide. This is made in such symmetry and size, that six men at arms with lances in rest in front together could ascend there the entire building. From the tower Anatole to Mesembrine are beautiful great galleries, all painted with antique combats, tales and views of the land. In the middle is such a stairway and portal, as we have said of the side next the river.

In the middle of the lower court is a magnificent fountain of beautiful alabaster. Above the three graces with cornucopias,

cloistered customs of the Carthusians. A is the gallery of t the cloister; B a first corridor isolating the religious from the noise and movement in the cloister; K a little portico, t that permits the prior to see the interior of the garden, and to supply the monk with wood or other necessary articles placed in L without entering the cell; C is a first warmed hall; D the cell with its bed and three pieces of furniture, bench, table and bookcase; F the covered walk with privy at the end; H garden; I the rotating opening in which was placed the food; this being constructed so that the religious cannot see what occurs im the gallery of the cloister. A little stairway in the corridor B gives access to the roof for oversight or necessary repairs. These arrangements ase found nearly similar in all the monasteries of the Carthusians scattered over the soil of western Europe.

Note 1. p. 309. Ann. Bened. Vol. 6. p. 45.

We shall not terminate this Article without transcribing the singular programme of the abbey of Theleme given by Rabelais, parodying in the 16 th century these great foundations of the middle ages. This buffoonery, under which is found a serious side as in everything left by that admirable writer, discloses the tendency of minds at that epoch concerning architecture, and how little were respected those institutions, which had r rendered so many services. This programme further relates to one subject, because it presents a singular mixture of monastic traditions and of arrangements borrowed from the chateaus erected in the earliest time of the Renaissance. After a burlesque conversation between friar John and Gargantua, the lat-latter decides to found an abbey for men and women, which one could leave when it seemed good. Then; "for the building and equipment of the abbey, Gargantua is to deliver 27,831 sheep with long wool, and for each year until the whole is complete, assigns on receipt of the goddess, 1,669,000 sun crowns and as many star chickens. For the foundation and maintenance of the same, he gives in perpetuity 2,369,540 rose nobles, of land rents, payable each year at the gate of the abbey. And f for this he passes to them fine letters. The building will be hexagonal, in such fashion, that at each angle is built a great round tower of 60 ft. diameter. And all will be equal in size and elevation. The river Loire flows at the nothern side.

they were decorated by paintings, that recalled the primitive times of the order, the life of its patriarchs. The Carthusians had no influence on the art of architecture; these monasteries remained isolated during the middle ages, and to that the owe the preservation nearly intact of the purity of their rule. Yet from the 13 th century, the Carthusians presented arrangements almost comfortable, compared to those of a century before, that they retained without important modifimations until their last times.

We give here (27) the plan of the Chartresse of Clermont,[1] modified in 1676. One can see with what care all is foreseen and combined in that group of cells, as well as in the general services. At O is the gate of the monastery giving entrance to a court, around which are arranged at P some chambers for guests; a bakehouse at T, at N are stables with rooms for cowherds, etc.; at Q barns for grain and hay. C is a little elevated court with fountain, reserved for the prior; B is the choir of the brothers,and H is the sanctuary, L the sacresty; M are chapels; K chapel of Bontgibaud; E chapter hall; S a little internal cloister; X refectory, and V kitchen with its dependencies; a the cell of the vice superior with its little garden b. From the first court one reaches the great cloister only by the passage F, wide enough to allow carting the wood required by the Carthusians; d is the great yard surrounded by the cloister galleries, giving entrance to the cells I, e each forming a small separate lodging with a private gardeu; R are watch towers; Z prison; Y cemetery; H is a tower serving as dovecot.

Note 1. p. 307. We owe this plan to the kindness of M.Mallay, diocesan architect of Clermont-Ferrand, who has indeed been willing to send us a tracing of the original. The Grand Chartreuse of Clermont is located at 31.3 miles from that city n near Bourg-Lastic; the plan presented is a project for restoration not entirely executed, but it has for us the advantage of furnishing a complete entirety, in which the services are carefully studied aud arranged.

The Carthusians only gathered in the refectory on certain days of the year;[1] usually they did not leave their cells; a brother passed them their meagre allowance through a rotating opening. The plan (28) of a cell clearly indicates the clois-

mass of documents buried in their rich libraries, and in form- these voluminous collections, that have become so precious to us today, and which are as it were the testament of this order.

We are only occupied with the religious establishments, that had a direct influence on their time, institutions that had contributed to the development of civilization; we have been compelled to pass in silence a great number of orders, that in spite of their importance from the religious point of view, did not exercise a special effect on the arts and sciences. Among these is however one that we cannot omit; this is the order of Chartreux, founded at the end of the 11 th century by S. Bruno. When the Cluniacs were constituted a government, mixing in all affairs of that epoch, S. Bruno established a r rule even more austere than that of Citeaux; this was the cenobite life in all its primitive purity. The Carthusians fasted on bread and water every Friday; the abstained absolutely from meat, even in case of sickness, their clothing was coarse and was horrible to see, as said Peter the Venerable in t the second book of the Miracles. They must live in the most absolute solitude, the prior and purveyor of the house alone being able to leave the enclosure of the monastery; each religious was shut up in a little cell, to which was added a little gardeu about the middle of the GV th century.

The Carthusians must keep silence in all places, saluting each other without saying a word. This order, which preserved more than any other the rigidity of the first times, had its principal house at Grand-Chartreuse near Grenoble; it was divided into sixteen or seventeen provinces, containing one hundred twenty nine monasteries, among which were counted some convents of nuns. These monasteries all took the name of Chartreuse, and were established preferably in deserts, mountains, far from inhabitated places. The architecture of the Carthusians shows excessive severity of the rule; it is always of a simplicity excluding all idea of art. Except the oratory and the cloisters, which present a monumental appearance, the remainder of the monastery consisted only of cells, primitively composed of a ground story with a little enclosure of some y yards. From the 15 th century only the arts penetrated into these establishments, but without taking a particular character; the cloisters and churches became less bare and naked; t

the 13 th century, to what degree of wealth they had arrived, what was the incredible extent of their dependencies and their buildings, and how much the monastic institution must change in the midst of these secular influences. S. Louis and his s successors made themselves the immediate protectors of Cluny; but even by that protection itself, attentive and perhaps jealous, they took from the great monastery that independence, which during the 11 th and 12 th centuries had been a powerful aid to the Holy See.[1]

Note 1. p. 306. To give an idea of the tendencies of the s royal power in France from the 13 th century, we shall cite the speech of king S. Louis on learning that after having excommunicated the emperor Frederic, and released his subjects from their oaths of fidelity, Gregory X offered the crown to count Robert, brother of the king of France:-- "He was astonished," said he, "by the audacity of the Pope, who dared to disinherit and cast from the throne such a great prince, who had no superior or equal amonm Christians." (Hist. de l'abb. de Cluny, by P. Lorain.

In losing their independence, the religious orders lost their originality as artist constructors; besides the art of a architecture taught and professed by them, left their hands a at the end of the 12 th century, and after that epoch, excepting some traditional rules preserved in the monasteries, and some special arrangements brought by the new preaching orders, monastic architecture does not differ from civil architecture. At the end of the 15 th centurw most of the abbeys had fallen into control of lay abbots, and that of Cluny itself fell to the house of Lorraine. In the 15 th century, before the reformation, many were secularized. Around the religious establishments all had advanced and been elevated, thanks to their persevering efforts and to the instruction they had given to the lower classes. During the course of the 13 th century, the m mendicant orders had fulfilled their task; they could only decline. When the religious storms of the 16 th century arrived, they were not in condition to resist, and from that epoch until the revolution of the last century was only a long agony. It is necessary to render this justice to the Benedictines, t that they employed that last period of their existence (as if they foresaw their approachiug end) in collecting an enormous

everyone knows, that the great church of the abbey of S. Denis was consecrated to the burial of the kings of France from the beginning of the monarchy.

Note 1. p. 305. Hist. du dioc. de Paris. Abbe Lebeuf. Vol. 1. p. 332; vol. 4, p. 216.

In the 13 th century the enclosure of the abbey also served as a place of gathering for sovereigns, who had to treat matters of great importance. When Innocent IV was forced to leave Rome and to seek in Christendom a place where he could avenge the debasement of the pontifical throne, free from every influence, he chose the city of Lyons; and there in the refectory of the monastery of S. Just in the year 1245, he opened the general council during which the deposition of the emperor Frederic was proclaimed. The bishops of Germany and of England would not appear there, and even S. Louis remained absent; yet he could not refuse an interview solicited by the sovereign pontiff, and the abbey of Cluny was chosen as the place of meeting. The Pope waited for fifteen days for the king of France, who arrived with his mother and brother, accompanied by three hundred sergeants at arms and a multitude of knights. On his part the Pope had with him eighteen bishops; let us see what the chronicle of the monastery of Cluny says of that interview. [2] "And it must be known, that in the interior of the monastery, there received hospitality the lord Pope with his chaplains and all his court; the bishop of Senlis with his household; the bishop of Evreux with his household; the lord king of France with his mother, brother and sister and all their suite; the lord emperor of Constantinople with all his court; the son of the king of Arragon with all his people; the son of the king of Castile with all his people; and many other knights, clerics and religious, that we pass in silence. And yet in spite of the innumerable guests, the monks were not disturbed in their dormitory, their refectory, chapter, infirmary, kitchen, cellar, nor in any one of the places termed monastic. The bishop of Langres was also lodged within the enclosure of the monastery." Innocent IV staid an entire month at Cluny, and S. Louis fifteen days.

Note 2. p. 305. Hist. de l'abb. de Cluny, by M. p. Lorain. p. 104 et seq.

This passage well shows what the great abbeys had become in

Augustine monks there; then Philip the Fair had all the buildings of the monastery entirely rebuilt, to place these religious of the order of S. Dominic. Here (26) is the plan of a part of the abbey. H is a fortified entrance with buildings of the excise and the lodging of the physician.; A the church; B great cloister; C refectory; D, 8 dormitories; F dormitory of novices; K cemeteries. At the west of the church are granaries and the laundry. N the fast kitchen; the feast kitchen is at the western end of the dormitory, at the angle of the c cloister. With the fast kitchen communicates a detached hall in which is a well with bucket, etc. G the little cloister; around it are the infirmary and its kitchen, rooms for strangers; L a chapel dedicated to S. John; O shops for joiners and a kitchen; M chapel dedicated to S. Dominic, around are the apartments of the princesses with dependencies and kitchens; near the fast kitchen is the lodging of the prior, then at the east the building for strangers; beyond the little cloister; at the south are barns, cellars, dependencies for the princesses of the blood royal, who frequently came to reside at the abbey of Poissy; then beautiful gardens, orchards, etc. One of the reasons that contributed most to cast into great confusion the arrangement of the buildings of monastic establishments was the habit of kings, queens or princesses and of the high secular nobility, most particularly from the 13 th century, to make sojourns, often quite lengthy, in the abbeys, t that they took the title of royal. At the convent of Maubuisson we have seen the lodging of the king; at Poissy, a considerable portion of the buildings of the monastery was reserved for members of the royal family. That custom only became more consistent during the 14 th cintury. Philip of Valois in 1333 dated his letters of State from the abbey of Val, where he was residing. Charles V likewise lived there in 1369. At the end of the 13 th century the treasure of the kings of France was deposited at the Temple in Paris; king Philip the Fair sometimes lodged there before the abolition of the order; he lived there in 1301 from Jan. 16 th till Feb. 25 th. [1] Frequently royal ladies were interred in monastic churches founded or enriched by them; the mother of S. Louis, queen Blanche, was interred in the choir of the church of Maubuisson; a sister of the same king died and was buried at Cluny. And finally,

century, monastic architecture no longer presents those beautiful general arrangements, that one loves to see at Cluny, Citeaux or Clairvaux; each day brought a modification of the primary arrangement; services were separated; the monastery seems to be confounded gradually with secular habitations. So Soon each monk had his little cell; the abbot built himself a separate lodging, a residence quite distant from the principal buildings of the monastery; he had his private entrance, court and garden. He was a lord whose life differs but little from that of the layman. These signs of decadence are increasingly evident until the epoch of the reformation, when the m monastic life was morally effaced, even if not actually abolished in the West. It suffices to glance at the plans of abbeys successivelw modified during the 14 th and 15 th centuries to recognize that confusion and lack of unity. These symptoms are strikiug in the Benedictine abbeys of S. Ouen of Rouen, F Fecamp, S. Julien of Tours, which we give here. (25). That a abbey had been rebuilt in the 13 th century, and was successively modified during the 14 th and 15 th centuries. B is the entrance to the monastery, also intended for believers going to the church; A the choir reserved for the religious; D the nave for the public; C the gate of the religious; X the cell of the porter; V the purveyor; E the cloister; L sacristy taken out of a hall not intended for that purpose; M storerooms; N prisons; F refectory and kitchen G; K a parlor for visitors; the dormitory was over the great hall extending the transept according to the ancient custom; Z cellars with rooms above for provisions; I bakery; H infirmary and its kitchen G; at the side are stables; R lodging of almoner and his garden; T garden of the religious; P palace of the abbot in its court, private entrance, stables and offices O, with garden at the east; S chapel of Holy Trinity. It is evident that if in this plan the ancient traditional arrangementr are still preserved, there prevails a certain confusion in the services, that did not exist in the plans of the 12 th century.

But if we examine the plans of an abbey rebuilt in the 14 th century, we shall be impressed yet more by the mass of dependencies and services, that are gathered about the principal structures. Constance, wife of king Robert, had caused the erection of church Notre Dame at Poissy, and installed Augus-

something of the primitive simplicity of their rules, they had no less made of their monasteries delightful residences by s situation, arrangement,and by collecting all that could aid in rendering life agreeable and peaceful. Habits of luxury and indolence could not fail to be introduced among them, from t the moment when they converted their poor huts of wood and p poor fields into vast palaces and magnificent gardens, where the received sovereigns within their walls, and could offer them the diversions, that the great ordinarily pursue, such as hunting, fishing, or the conversation of learned and distinguished men, good libraries, and especially the calm and freedom of the country.

Note 2. p. 300. "Once S. Augustine had greater dignity than S. Francis, but it was some ages earlier." The said hermit f friars of the order of S. Augustine have had three different houses at Paris. First they lived in the street still called from that of the Old Augustins. Their church was the chapel of S. Mary of Egypt near gate Montmartre, which was then outside the city, was rebuilt at the cost of a cloth merchant of Paris. Secondly theylived near gate S. Victor in an uncultivated area full of thistles, therefore called Cardinetum from Carduus (thistle), extending from the said gate to Rue de Bievre, where the enclosure of church S. Nicolas retains the n name of Chardonnet. In the year 1288, king Philip the Fair g granted the Augustines the use of the walls and towers of the city; prohibiting all persons from going or staying there without their leave. But seeing that they counld not conveniently live in such a place, on accound of the little alms given them; by the consent of the said king and the bishop of Paris, Simon Matthias de Bucy, they sold what they had acquired at Chardonnet, and came to hold the place where they are at present, that was ceded to them by the friars of Penitence of Jesus Christ, called Saccarii in Latin, and Sachets (sacks) in French. " Du Breuil, Theat. des antiq. de Paris. Book 2.

Note 3, p. 300.(See Latin text).

Perhaps the institution of the orders of mendicant friars c contributed to prolong the existence of the religious life; it preserved at least its unity for some time. But this was no longer that great and powerful Benedictine order; the heroic times of S. Hugues and S. Bernard were past. From the 13 th

Note 1. p. 300. This beautiful monastery, now much mutilated, is occupied by artillery quarters; the church is divided into stories, the beautiful stone tracery of the windows was destroyed some years since. Stables are arranged in the cloister and in the pretty painted chapel of S. Antoine. Among these paintings some are very remarkable, that are nowise inferior to Italian paintings of that epoch; but they change fore daily. The columns and capitals of the great cloister are of gray w marble from the Pyrenees.

From the ancient foundations, [2] the order of hermit friars of S. Augustine had acquired but slight influence until the institution of the mendicant orders, but then it took a great development, and was especially protected by the kings of France during the 13 th, 14 th and 15 th centuries. Yet the establishments of the Augustinian friars long retained their c character of primitive simplicity; their churches were nearly always either composed of a single aisle, or of a nave with t two side aisles, but without transepts, radiating chapels or towers; thus were arranged the churches of the great Augustine monastery at Paris. Here (24 ter) is the monastery of the Augustine friars of Vaux-Verts near Brussels, [3] that we present as an entirely complete example of these establishments of the mendicant friars with all the developments, that they had taken at the end of the 15 th century. A is the church w without transepts or towers according to customs adopted in Augustine monasteries; B the library, a long gallery above the cloister; C dormitories of the religious; D dormitory of laymen; E great cloister of the religious; F cloister of laymen; G refectory; H infirmary; I kitchen, communicating with the refectory by a little covered bridge; K lodgings for men (guests); L for women; M houses of artizans; N lodging of the emperor (Charles V); O the oak, according to the legend, under which were collected seven crowned heads; P prinpical gate of the monastery; R cowhouse and sheds for forage; S gardens with a labyrinth, alleys planted with trees, chapels, etc. This l location was admirable in the midst of the forest, in a valley provided with fine water, near meadows and great orchards, a and one understands that in such establishments, sovereigns loved to rest from affairs of state and the etiquette of courts; and if the mendicant friars in their buildings retained

forests. [1] The Jacobins, hemmed in along the walls of the city, finally obtained the parlor for citizens, that king Charles V gave them in 1365, after having acquired the franchise and r rental of this municipal property. Afterward the buildings of the monastery were rebuilt in part; but the church A and the hefectorw B dated from the primitive construction. The school of S. Thomas D was a pretty Renaissance hall, that we saw demolished recently. The church of the Jacobins of Agen, built about the middle of the 13 th century, has two aisles, as well as that of the Jacobins of Toulouse,erected in the second half of the 13 th century. We give here (24 bis) the plan of this beautiful establishment. Originally the church was entirely without chapels, those of the nave and apse only being erected during the 14 th and 15 th centuries. The entrance of believers is at S at the side of the right aisle, at the front end of the left aisle were the stalls of the relegious. On the w wall of the right aisle next the little cloister C is noticed the pulpit, now destroyed, but whose traces are visible, and is indicated on an old plan deposited in the Capitol of Toulouse; the entrance of the believers was preceded by a court or open narthex; it was by this court that one also entered the monastery by passing the little cloister. At B is the great cloister; at D the chapter hall; F the sacristy; E a little chapel dedicated to S. Antonine; G the refectory. The buildings indicated by hatching are of the last (18 th) century. All these structures are of brick, executed with great care and covered internally by paintings dating from the 13 th and 14 th centuries. [1] Then the preaching friars were very far r removed, at least in their buildings, from the humility recommended by their founder. (Arts. Cloitre, Chapelle, Eglise, R Refectoire).

Note 1. p. 297. Saint Francois d'Assises et Saint Thomas d'Aquin, by E. J. Delecluze. Vol. 1. p. 278, et seq.

Note 1. p. 298. Le Th. des Antiq. de Paris, by J. Du Breuil. 1634. Vol. 2. p. 378. During the piercing of the new Rue Soufflot, we saw destroyed the last vestiges of the monastery of the Jacobins, which extended across the walls of Paris. See the Statisque monumentale de Paris, published under the direction of M. Albert Lenoir.

Note 1. p. 299. J. Du Breuil., Th. des Ant. de Paris. p. 380.

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condition of poverty. [1] But S. Francis was not dead when his order had already wandered singularly from the simplicity and that primitive poverty; and from the 13 th century the minor friars erected monasteries, that in their wealth were inferior in nothing to the abbeys of the Benedictine orders. S. Louis had a great affection for the preaching and mendicant friars; even from his time that extreme solicitude for the disciples of S. Dominic, of S. Francis of Assizi, for the eremetical Au-Augustinians and Carmelites, who were then little known, was the subject of bitter satires. As politics, S. Louis was certainly disposed certainly too to give to the new orders a predominance over the independent establishments of Cluny and Citeaux, and he found the preaching friars a powerful arm to vanquish those popular heresies, born in the 12 century with all the characteristics of a rebellion of the lower classes against the clerical and secular power. S. Louis had built at Paris the monastery of the Jacobins, which by master John, dean of S. Quentin and by the University from 1221, had been put in possession of a house in Rue S. Jacques, opposite to S. E Etienne des Grecs. [1] The church of this monastery presented an arrangement unknown before; the nave was composed of two aisles separated by a row of columns. Perhaps this arrangement appeared more suitable for preaching, for the stalls of the religious were placed in one of the aisles, the other parallel one remaining for the believers, who could thus easily see and hear the preacher seated in a pulpit at one end. But the preaching friars came late, and since the nature of their mission obliged them to approach the great centres of population, they no longer found great sites, that allowed them to extend and to arrange the structures of their monasteries according to a uniform rule. Then one more rarely finds in the monasteries of the mendicant orders that traditional arrangement so well observed in the establishments of the Benedicitines, especially of the rule of Citeaux. The plan of the Jacobins of Paris (24) is very irregular; the refectory joins the parlor for c citizens, which intersected the city walls built under Philip August. This refectory had been erected in 1256 by means of a fine of ten thousand livres, that lord Engerrand de Courcy, third of that name, had been condemned to pay for having hung three young Flemings, who had been taken while hunting in his

them. Thus the Benedictine institution had introduced people into civil life, and as these developed under the protecting power of royalty, the monasteries saw their importance and t their external effect decreased. Instruction alone remained to them; but their condition of landed proprietors, their wealth, the management of the considerable properties, that they had immoderately accumulated in their hands during the crusades, left them little leisure to devote themselves to instruction, in a manner able to rival the schools established in t the cloisters of the great cathedrals under patronage of the bishops, and particularly at Paris on the hill of S. Genevieve.

Then at the beginning of the 13 th century the Benedictine institution had terminated its active mission; then appeared S. Dominic, founder of the order of preaching friars. After having cleared the soil of Europe, after having cast in the midst of the people the first foundations of civil life, and having scattered the first ideas of liberty, order, justice, moraility and law, the time had come for the religious orders to develop and guide minds, to oppose by word as much as by the sword the dangerous heresies of the Vaudois, the Poor Men of Lyons, Ensabettes, Flagellants, etc., and finally the Albigenses, who seemed to summarize all these. The preaching friars soon acquired an immense influence, and the greatest minds arose among them. John the Teutonic, Hugues of S. Oher, Peter of Verona; John of Vicenza, S. Hyacinthe and S. Thomas Aquinas, filled Europe with their sermons and their writings. Also about this time (1309) S. Francis of Assizi instituted the order of minor friars. The establishment of these two orders, Dominicans and Minor Friars; the former devoted to preaching, to h the devlopment of human intelligence, to the support of the orthodox faith, and to the study of philosophy, the latter p preaching the renunciation of worldly goods, absolute poverty, was a sort of reaction against the semi-feudal institution of the Benedictine orders. Indeed in his rule, S. Francis of Assizi, desiring to return to the simplicity of the first apostles, does not allow the prior or all the minor brothers to p possess anything, but on the contrary must beg for the poor and to supply their own needs; he claimed to bring the rich to give their possessions to the poor, to acquire the right of asking alms for himself without shame, and thus to relieve the

dominate the courts and buildings. Under the tower E was the entrance of the church for believers; I are dormitories; K refectory and L kitchen; H the library; N presses; O infirmary; M lodgings of the guests and the abbot; X are barns and cellars. Gardens furnished with trellises were placed at P, according to custom, behind the apse of the church. A small river R [1] protected the weakest part of the walls and watered a great orchard planted at T. Thes abbey was founded during the 9 th century, but most of the structures indicated in the plan date from the second half of the 12 th century. There is even reason to think that the defenses do not date at a period before the 12 th century.

Note 1. p. 298. River Tiretaine. The abbey of S. Allyre was rebuilt under the pontificate of Pascal II, consequently in the first years of the 12 th century. It was formerly comprised in the enclosure of the city of Clermont, but was only f fortified later, when it was left outside the new fortifications, toward the end of the 12 th century. (Mabillon. Ann. ben. . Antiq. de la France).

The abbots being judges in their own domains, like the feudal lords, prisons formed a part of the monastery; they were almost always placed beside the tower, often even in its lower stories. If in the vicinity of the cities and in the country, monastic structures in the 13 th century daily recalled more and more the feudal structures of the secular lords' on the contrary within the cities, the abbeys tended to mingle with civil life; frequently they destroyed their primitive walls to build regular houses having a view and entrance from outside. These houses were at first occupied by the artizans, that we have seen shut up in the enclosures of the monasteries; b but if these artizans still depended on the monastery, this was no longer as farmers, so to speak, obtaining the use of their lodgings in return for the benefits produced by the exercise of their industry; besides they were not subject to a any religious rule. Once in that path, the monasteries of the cities soon lost all direct control of its tenants, and the secular dependencies of religious houses were further only properties, returning a profit in rent. Yet one cannot doubt, that the guilds of the trades took rise in the midst of these industrial groups, that the great abbeys had formed around t

some works of moderate importance; one finds the monastic architecture under that military covering; besides originally deprived of means of defense, they were only gradually fortified and according as they became more or less similar to feudal manors. Here is the abbey of S. Allyre at Clermont in Auvergne, a cavalier view of which gives an idea of those groups of structures, half monastic and half military. (23). [1] Built in a valley, it could not resist a regular siege, but was sufficiently furnished with walls and towers to sustain the attack of a body of partisans.

Note 1. p. 290. The enclosure of this city was rebuilt under Charles VII, but this replaced the ancient fortifications, of which numerous traces are found.

Note 1. p. 291. Mabillon. Annal.bened. Vol. 4. p. 75. (See Latin text).

Note 1. p. 292. This name was given after the institution of the order of S. Michel under Louis XI. In the 13 th century it was probably the dormitory of the garrison.

Note 2. p. 292. Mt. S. Michel is now a house of detention; floors and partitions intersect the beautiful hall of the knights and the dormitories. In 1834 the carpentry roof of the nave of the church was burned and the Romanesque masonry of t the nave suffered much from that disaster. The choir is well preserved, and although built of granite, is one of the most labored works of pointed architecture of the late time.

Note 1. p. 294. This view is copied from one of the engravings of the Monasticon Gallic. (Monog. des abbayes. Liby. S. Genevieve).

At the east is the gate of the monastery protected by a tower, at the side V are the stables intended for the animals of guests; B is a first court not defended by battlemented walls, but only surrounded by buildings forming an enclosure and receiving light only through the interior. B' is a second battlemented gate, that leads to an alley commanded by the church C, well supported by battlements and machicolations. The eastern facade of the church, its apse, is crowned by two towers, one commanding the angle of the street, the other dominating the gate ? giving entrance into the buildings; machicolations also crown that gate. One enters a first narrow and closed court, then the cloister ?. ? ?' are towers with battlements that d

introduced the poor, to which were distributed alms. At G is a hall to serve as a refectory for the garrison, with private stairs to descend to the terrace. At the south side at I are placed the cellars of the lodgings of the abbot and his guests; at L and K are prisons and defenses. Above these substructures the buildings extend on the rock and assume more importance; (19). One ascends by inextricable turns, narrow and bent stairways at the point B, where are located the kitchens. D was the dormitory of the monks, E the so-called hall of the knights.[1] C is a vast crypt rebuilt in the 16 th century to support the choir of the church, that was rebuilt at that epoch; F, H are substructures of the ancient nave and the Romanesque transepts, so as to supplement the rock, which does not present a sufficient area at those points; G are lodgings of the abbot and his guests; I is under the library. The cloister is located over the great hall of knights E. The area of the cloister is covered with lead to collect rainwater, that passes into the two cisterns placed beneath the north arm of the cross. Above the gate A is a hall for the watch. Finally the church (20) dominates that entirety of colossal buildings, constructed of granite, and which presents the most imposing appearance in the midst of that foggy bay. The great buildings that look out on the open sea on the north side may pass for the finest example, which we possess of religious and military architecture of the middle ages, or the marvel, as they have been named for all time.[2] The great hall of the knights (Fig. 19 E) possesses two great fireplaces and corbelled privies. We give (21) an external view of these buildings from the sea; and a view (22) from the east. The spire surmounts the central tower of the church, but was destroyed long since; it had been rebuilt on several occasions, the last time by abbot Jean de Lamps about 1510; we assume it to be restored in the view here given; a colossal statue of the archangel S. Michel, which could be seen afar at sea, crowned its summit. Lightning destroyed that spire shortly after its erection. The abbey of Mt. S. Michel found itself in an exceptional situation; it was a military place that sustained sieges, and could not be taken by an English army in 1422. Rarely did religious establishments present such formidable defenses, they almost always retained the appearance of villas with battlements, defended by

by the sea twice daily, and whose summit is more than 230 ft. above its level.(17). A narrow rocky shore opens south of the side next Pontorson: at some steps from the sea the rock rises abruptly. One finds a first fortified gate at B with guard h house.[1] A second gate opens at D and gives entrance into the little city inhabited from time immemorial by fishermen. From that gate one soon reaches the boulevards by a stairway, and by following the ramparts that rise on the rock at the east, he soon arrives at large flights of steps turning toward the north to the gate F of the abbey, protected by a first enclosure E. B is the cloister; A the church, erected on the highest part of the hill; the spaces G arranged in terraces on the s south side were the gardens of the abbey; beneath the church is a cistern; H is a terrace to which access is by an immense and very steep stairway L K, and which was intended in case of siege to permit the introduction of aid from the side of the open sea; L is a fountain of brackish water, but good for ordinary uses; M is an oratory on an isolated rock, dedicated to S. Hubert; P is a fortified entrance giving access to a c court in which the storehouses of the abbey were placed at Q; V and S are cisterns and R is a windmill placed on a tower; I is a great channel of stone and wood by which with a windlass the provisions of the monastery were hoisted; O is the parish church of the city and T is the cemetery. If we pass the threshold of the first defense of the abbey, here (13) is the p-plan of the buildings forming the ground story and surrounding the summit of the rock. At A are the first entrances, defended by a terrace to which one ascends by a little straight stairway; B the gate is a formidable defense crowned by two turrets and a hall, whose plan is detailed at C. Beneath this gate is arranged a narrow stairs, which leads to a second closure protected by portcullis and machicolations, and a hall from which one can enter the monastery only through masked w wickets and winding narrow stairs. Above that hall is a defense D pierced by slots and with machicolations. Each comer m must deposit his arms before entering the abbey, excepting by express permission of the prior.[1] The refectory is at F; one can reach it from without only by a dark corridor defended by portcullises and a winding stairway, on a level with the entrance hall and under the refectory is the hall into which were

uniting the remains of the powers of the religious orders to military strength, it must give umbrage to royalty, and it is well known how at the beginniug of the 14 th century, this institution was destroyed by the monarchical power.

The influence of the military life on the religious life m makes itself felt from the 13 th century in monastic architecture. The structures erected by the abbots at that epoch manifest their political state; feudal lords, they adopt their ways. Until then the monasteries were surrounded by enclosures, rather rural closures than walls suitable for resisting an ararmed attack; but most of the monasteries built in the 13 th century lost their purely agricultural character to become f fortified villas or even actual fortresses, when the location permitted. The abbeys of the order of Citeaux, built in deep valleys, permitted little application of a defensive system of some value; but those belonging to other rules of the Benedictine order, frequently built on the slopes of hills, or even precipitous localities, surrounded themselves by defenses established so as to be able to sustain a regular siege or at least to protect themselves from a sudden attack. Among the abbeys that very clearly present the character of an establishment both religious and military, we will cite the abbey of S. Michel en mer. If one can believe the legend, founded toward the end of the 8 th century, it was devastated on several occasions by wars and fires. In 1203, having become a vassal of the royal domain, it was almost entirely rebuilt by abbot Jourdain by means of considerable sums sent him by Philip August, the new buildings were continued by the successors of that abbot till about 1260.

Mt. S. Michel is situated at the bottom of a sandy bay daily covered by the ocean at the hours of flood, not far from P Pontorson and Avranches. It was an important military point at that epoch, when the French monarchy had just taken possession of Normandy, and when it daily feared an invasion by the Anglo-Normans. Yet Philip August left the hill in the possession of the abbots, regarding them as vassals, and giving them subsidies to place their property in a state of defense, and he did not seem to doubt that the religious could retain it, just as well as a secular owned could. That is a fact characteristic of the epoch. Here is the general plan of that rock washed

and as territorial and consequently feudal owners, could not fail to introduce into the midst of the monasteries habits of luxury little in accord with the monastic vows. S. Bernard was filled with energy against the abuses, which already in his time appeared to quickly bring the decadence of the orders, and leaving Citeaux, he had sought to restore its ancient purity to the rule of S. Benedict, with a constancy and rigorous principles, that were fully successful while he lived. From his time monastic life acquired a vast moral influence, and extended even into the camps by the institution and development of the military orders. There was no princely family then, which did not have representatives in the different monasteries of the West, and most of the abbots were of noble race. The monastic institution was at the head of civilization.

From the day that the royal power was established, when France had a real government, these little religious republics gradually lost their importance; buried in their religious d duties, of landed proprietors, of teaching bodies, the activity that they had displayed outside during the 11 th and 12 th centuries no longer finding sufficient scope, was lost in internal quarrels to the great injury of the entire institution. The nobility every day supplied a smaller contingent to the monasteries, and from the 13 th century being entirely devoted to the career of arms, commenced to disdain the religious life, that no longer offered but an internal and restricted existence, so that soon the monastic orders fell into a state nearly resembling that of rich and peaceful proprietors united in common under a discipline, that gradually became less rigid. Soon the abbots, regarded by the king as feudal lords, like t them could not remain outside the established political organization; so that the secular forces were divided, so that it was possible, if not easy, to maintain and increase their own; but when these feudal powers came to be confused with the royalty based on the national unity, the contest could not last, it had no other purpose, it was contrary to the monastic spirit, that had only traced the route for the powers to arrive at unity. The grea religious establishments became resigned, and ceased to appear on the political stage. The order of the Temple alone by its constitution could continue to play a part in the State, and to take an active part in external affairs;

seemed to exceed the strength of women, and it is probable t that the rule applied to nuns as to monks, was not long observed by the former. It is interesting to read the letter, that Heloise, after becoming abbess of the Paraclete, addressed to Abelard on this subject, and one can judge by the objections contained in that letter, how much of her time was occupied by the internal organization of the convents for women. If in the 13 th century, the monastic rules to which the nuns were subjected felt the relaxation of manners at that epoch, still we shall see by examining the plan of the abbey of Maubuisson, that this convent did not vary from those for communities of men.

At A is the church, in the extension of the transept according to custom being the chapter hall, sacristy, etc.; above being the dormitory. B is the cloister; C the refectory; D the boarding school; E the parlor, and the lodging of the nun attendants; F the kitchen; G are privies arranged on both sides of a stream; H the lodging of the abbess; I ovens and sheds; K dispensary; L lodging reserved for the king S. Louis, when he went to Maubuisson with his mother. For after the 13 th ce century one finds in abbeys founded by royal persons a lodging reserved for them. M is the infirmary; N a barn; O a dovecot; P a pigpen; Q are sheds and stables; from I to the sheds were erected buildings to contain the lodgings of guests, but these structures are of a later epoch; R was the watering place. V Vast gardens and streams surrounded these buildings situated in a charming valley, opposite the city of Pontoise, and the whole was enclosed by walls flanked by small towers. 1

Note 1. p. 287. See the Notice of that abbey by M. Herard. Paris. 1857. Also the curious drawings of that architect deposited in the Archives of the Historic Monuments, Ministry of State. The railway of Creil now passes through the enclosure of the abbey.

The new political order born with the 13 th century must n necessarily profoundly modify the monastic institution; it must be said that the religious establishments, from the moment t they ceased to contest the abuse of power by the secular lords, the obstacles opposed by uncultivated lands, or the ignorance and brutalization of the rural population, rapidly fell into relaxation. Their wealth and importance as a religious power

dormitory. I are great halls with dormitories above. K are c cellars; L the kitchen. M the chapel of S. Michael.

Note 2. p. 283. A is the church, the base of the tower alone remaining; its construction dating from the 11 th century. B is the great cloister. C the chapel. D the garden. E the refectory, and F the kitchen.

Note 3. p. 283. A is the church; B the cloister; C the principal gate of the abbey next the city. D the gate called papol next the meadow. E the chapter hall with dormitories above. F the chapel of the Virgin, built by pierre of Monterau. G is the refectory, built by the same architect. H are cellars and presses. I is the abbot's house. K are privies. L are gardens. M dependencies. T the infirmary at the end of the building E.

Yet it is not meant that the religious orders at the beginning of the 13 th century entirely abandoned the country, if they felt the necessity for approaching the centres of activity, of participating in the new life of the people thirsting for organization and instruction, but they continued to found rural monasteries; it even seemed, that at that epoch royalty desired to maintain the dominance of the abbeys in the country; perhaps it did not see without anxiety the new tendency of the orders to approach the cities, thus abandoning the fields to the secular feudal influences, that until this they h had energetically opposed. The mother of S. Louis made numerous donations to erect new establishments in the country; she founded in 1236 the abbey of Maubuisson, intended for nuns of the order of Citeaux. We find again in this plan (16) the primitive severity of the Cistersial arrangement, but in the style of architecture, as at the abbey of Val, whose reconstruction dates nearly at the same epoch, with concessions made to the dominant taste of the period; sculpture is no longer e excluded from the cloisters, the rigor of S. Bernard yields to the need of art, which then made itself felt in the most m modest structures. The abbey of Maubuisson was at the same t time an agricultural establishment and a house for the education of young girls. In the 13 th centurw the religious no l longer cultivated the land with their own hands, but contented themselves with overseeing their farmers and managing their rural properties, and for a yet stronger reason for the nuns. Already at the beginning of the 12 th century the work in the

were the inn for strangers, almonry, prisons, then finally t the dependencies around the buildings of the great cloister, separated by courts or gardens. At the east was a free space, retired and planted, that seems intended for the private use of the abbott and the religious. To summarize this programme, the church once being given, the purely material services, or that could be fulfilled by laymen, were always placed at the western side in the vicinity of the porch, while all connected with the moral life and the religious authority approached the choir of the church. But if during the 11 th century the Benedictine institution was moved by a preference for agriculture, if by incessant labor, by perseverance, it had fertilized the uncultivated lands given to it; at the middle of that century this task had been fulfilled; the monasteries were s surrounded by villages newly founded and occupied by peasants, and had no longer the same reasons for devoting themselves e exclusively to cultivation, they could afterward rent their lands, and devote themselves to instruction. After having satisfied the material needs of the people by reestablishing agriculture on the soil of western Europe, they were called to feed the minds, and had already entered that path. Thus we see at about the end of that century the orders resort to the cities, or rebuild their monasteries then become insufficient near the great centres of population; retaining only the church, that consecrated place, they erected new cloisters, vast and beautiful buildings in accordance with these increasing n needs. Thus monastic architecture begins to lose a part of its proper character, and is already founded on civil architecture.

At Paris the prior of Cluny completely rebuilt the monastery of S. Martin des champs, except the sanctuary of the church, whose erection dates from the reform of that monastery. Here (13) is the plan of that priory. [1] The abbot of S. Genevieve likewise rebuilt his abbey. (14). [2] Then a little later the a abbot of S. Germain des Pres allowed the nave of the church to remain, and commenced the erection of a new monastery, that was finished by a lay architect, Pierre of Monterau. (15). [3]

Note 1. p. 283. A is the church, whose choir dates from the first years of the 12 th century, and the nave was rebuilt a about 1240. B is the cloister, C the chapel of Notre Dame. D the refectory. G the chapter hall. H the mortuary. F a little

founded schools at Paris, a sort of adjuncts taking their names from the mother houses, in which they collected the religious, who lived there according to the rule, and teaching youths t that came from all points in Europe for instruction in the r realm of the sciences. The religious orders then preserved their influence on the instruction in their time, although t they were no longer its centre.

From the 9 th to the 11 th centuries the religious orders were occupied by great reforms, placing themselves at the head of the social organization, and had too much to do to think o of founding vast and magnificent monasteries. Their wealth a also only commenced to take a great extension at that epoch because of the numerous donations made to them, either by sovereigns desiring to increase their salutary influence, or by secular lords at the time of the crusades. Also at that epoch monastic architecture took a peculiar character; yet nothing is yet difinitely fixed; a long experience was required to recognize what arrangements were best. Cluny had its programme, Citeaux had its own, and all that differed little from the p primitive requirements adopted at the time when the abbey of S. Gall was drawn. But towards the end of the 12 th century a and the beginning of the 13 th, when the monastic establishments had become rich and had to struggle no longer against the barbarians of that age, were less occupied with moral interests and could think of erecting commodious dwellings, even elegant and well arranged, according to the secular customs of the t time. The chief requirements were retained; the cloister was placed at one side of the nave, and frequently on the south, giving entrance to the chapter hall, treasury, sacristy, and the dormitory above, built as an extension of the transept for reasons already given. Along the gallery of the cloister opposite and parallel to it along the nave was erected the refectory, airy and vast, almost always having but a ground story. At the return and facing the porch of the church are placed the cellars, above being the storehouses of grain and provisions. The kitchen is always detached, possessing its pantry, entrance and private court. In the east wing beyond the refectory or along the second cloister were the library, the cells of the copyists, the lodging of the abbot and the infirmary. Near the entrance of the church and on the opposite side

development of agriculture. Particqlarly the order of Citeaux, occupying itself with more care in the education of the lower classes thau that of Cluny, had organized its lay brothers in groups; it had brother millers, bakers, brewers, orchardists, curriess, fullers, weavers, shoemakers, carpenters, masons, horseshoers, joiners, locksmiths, etc. Each company had a foreman, and at the head of these groups was a monk director, who was charged uith the distribution and regulation of the work. At the beginning of the 12 th centurw and under the influence of this organizing impulse, there was even raised a sort of religious company, yet living in the world, that took the name of bridge builders. [1] This community undertook the establishment of bridges, roads, hydraulic works, streets, etc. Its members moved according as their services were requested at different places in the territory. The religious orders thus opened the way for the lay corporations of the 13 th century, and when they saw the monopoly of progress in letters, sciences and arts escape from their hands, they did not yield to discouragement, but on the contrary, they approached new centres.

Note 1. p. 281. Du Conge, Gloss. (See Latin tekt of note).

Towards 1120, Otho, son of Leopold, Mahquis of Austria, hardly at the age of twenty years, retired to Morimond with several young lords of his friends, and assumed the religious habit; recognizing in him au elevated mind, the abbot of the monastery sent him to Paris after his novitiate with some of his companions to study scholastic theology. This is the first example of a professed religious leaving his cloister to obtain outside the instruction, which then profoundly moved all minds in the capital of the royal domain. Otho was soon seated in the abbot's chair of Morimond, elected by acclamation. He elevated the instruction in that house to a superior degree; afterward a number of religious belonging to the orders of C Cluuy and Citeaux went to seek science in the cloister of Notre Dame and in the schools founded by Abelard, so as to maintain the instruction in their houses at the level of knowledge at that time. But the light began to point outside of the cloister, and its centre was no longer at Cluuy or Citeaux. At the end of the 12 th and during the 13 th centuries, these r religious establishments did not restrict themselves then, but

and soon the abbots parted with these fiefs in favor of the bishops, who thus entered again into possession of the jurisdiction of which they had been despoiled; for that justice m must be rendered to the religious orders, that they contributed powerfully to restore unity to the Church, either by recognizing and defending the authority of the Holy See, or in reuniting the ecclesiastical properties invaded by secular f feudalism, to replace them in episcopal hands. Men like S. Hugues, S. Bernard, Suger, Peter the Venerable, had too elevated minds to not understand that the monastic state, such as existed in their times, and such as they had made it, was a transitory condition, a sort of temporary mission, called to draw society out of barbarism, but which would lose a great part of its importance from the day when success came to crown their efforts; indeed already at the end of the 12 th centurw, the influence acquired by the Benedictines in the affairs of this world became weakened, education passed out of t their hands, the market towns and villages, that had grown up around their establishments, were erected into communes, possessed lands in their turn, and were no longer groups of poor colonists brutalized by misery; they became independent, even sometimes insolent. The bishops resumed the diocesan power a and contended with reason, that they were the sole representatives of religious unity; the monastic prilileges were often opposed by them as an attack on their jurisdiction, being only amenable to the court of Rome. The papacy, that had found such powerful assistance in the monastic institution during the 11 th and 12 th centuries, at the epoch of the struggles with the imperial power, seeing the secular governments organize themselves, had not the same motives to allow absolute independence to the great abbeys; it felt that the moment had come to reestablish the Catholic hierarchy according to its primitive institution, and with that prudence and knowledge of the time, that characterizes its acts, it supported the episcopal power.

Note 1. p. 280. Among others, those of Rheims, Amiens and Laon.

Note 2. p. 280. Hist. de l'abb. de Morimond, by Abbe Dubois. Chap 23.

During the course of the 12 th century, the Benedictine institution was not restricted, as we have seen it, to the dev-

intervening in temporal affairs, even sometimes controlling them; Suger, abbot of S. Denis, is the religious statesman, a minister, a regent of France. Peter the Venerable personifies the religious life; he is, as M. de Remusat said judiciously, "the ideal of the monk." Besides these three man appeared Abelard, the man of Slience. (Art. Architecture, Developpement de l'). Two schools already celebrated at the beginning of the 12 th century were established in the cloister of Notre Dame and in the abbey of S.Victor; Abelard founded another, that adding other pupils to his own, founded the university of Paris. The fame of this new centre of instruction eclipsed all the schools of the great abbeys of the West.

Note 1. p. 272. Saint-Anselm de Cant., by M. de Remusat. C Chaps. 1, 2. Paris. 1853.

The religious establishments had contributed not a little to the development of the communes by the model organization they presented, the fellowship between the inhabitants of the same monastery, and by their spirit of independence. Charters of enfranchisement were granted in the 12 th century, not only by bishops, temporal lords, [1] but also by abbots. The monks of Morimond, Citeaux and Pontigny uere the first to incite establishments of communes around themselves. All monasteries in general in maintaining parochial unity produced communal unity; their archives give us examples of municipal administration copied from monastic administration. The mayor or syndic represented the abbot, and the elder men called to deliberate on the affairs and interests of the commune, the aged men of the monastery that aided the abbot by their advice; [2] the election, which was the basis of authority in the monastery, w was likewise adopted by the commune. More than once the monks had reason to repent having aided in the development of the municipal spirit, but in this case as in many others, they w were the instrument employed by Providence to civilize Christendom, to be broken when it had fulfilled its mission. Before the 12 th century a great number of parishes, of collegiate churches, that had become the prey of feudal lords, who thus enjoyed ecclesiastical benefices, were removed from the episcopal power. Gradually, due to the consistency of the religiou orders, their influence, these benefices were conceded to them by the secular nobility under the title of donations, a

This st ict constraction of the the two most important abbeys of the West, Cluny and Citeaux, both Burgundian, gave to the entire architecture of that province a strong and noble appeance, that does not exist elsewhere, and that remains impressed on its monuments until toward the middle of the 13 th century. The Cluniacs had formed a school of artists and artizans very advanced in the study of construction and of architectural combinations, skilful sculptors, whose works are impressed with a remarkable style; it is something grand, elevated, true, that strikes the imagination, and engraves itself iu the memorw. The school of statuary of the Cluniacs possesses an incontestable superiority over the contemporary schools of Poitou, Saintonge, Provence, Aquitaine, Normandy, Alsace, and even of Ile de France. When one compares the statuary and ornamentation of Vezelay of the 11 th and 12 th centuries, of Dijon, S Souvigny, Charite-sur-Loire, Chailieu, with that of the provinces of the West and North, he remains convinced of the power of these artists, of the unity of the school in which they were trained. (Arts. Statuaire, Sculpture). The Burgundian a abbeys established in countries where stone is abundant and of excellent quality, knew how to profit by the beauty, dimensions and strength of the materials drawn from the ground, to give their edifices that grandeur and stability, which are no longer found in provinces where stone is scarce, bad and weak. The architecture of Cluny, already rich from the 11 th century, refined in details, could still be imitated in countries less favored in materials; but the style of architecture adopted by the Cistersians was so inherent to the nature of the Burgundian limestone, that it could not develop otherwise than in that province. These purely material reasons, and the general tendencies of the monastic orders to external luxury, tendencies vainly opposed, contributed to restore the architectural influence of the rule of Citeaux. While S. Bernard made such powerful efforts to arrest the decadeuce of the Benedictine order, already foreseen by him, a revolution in instruction was going to take from the monastic establishments their intellectual predominauce.

In the 12 th century after glorious struggles and immense labors, the monastic order collected all its powers within itself. S. Bernard represents the religious principle inter-

equality entered into the customs of a nation, men commenced to regard art as a matter of luxury, and no longer as a common nurture, so necessary and perhaps more necessary to the poor than the rich. The Benedictines do not treat questions of utility with modern pedantry, but in fertilizing and establishing mills, draining marshes, calling the country people to l labor, instructing youths, they accustomed the eyes to beautiful and good things, their structures were durable, very appropriate to the needs and yet graceful, and far from giving them a repulsive appearance, or overloading them with false ornaments, deceptive decorations, they proceeded so that their schools, monasteries, churches, should leave art memories to fructify in the spirit of the people. They taught patience and resignation to the poor, but they knew men, felt that in giving to the ignorant and disinherited classes a recreation for the eyes in the lack of other things, it was necessary to refrain from false luxury, and that purely moral instruction could be adapted only to elect spirits. Cluny understood that mission well and boldly entered that path; its monuments and churches were a book opened for the multitude; the sculptures and paintings with which it ornamented its doors, friezes, c capitals, and which recalled sacred history, popular legends, the punishment of the wicked and reward of the good, certainly attracted more the attention of common people, than the eloquent sermons of S. Bernard. Thus we see that the influence of that extraordinary man (an influence perhaps understood with difficulty in our age, when all individuality is effaced) exerted on the great, on bishops, nobility and sovereigns, on the regular clergy which then comprised the elite of the West; but in elevating himself by high intellect above the arts of form, in proscribing them as a monstrous and barbarous interpretation of the sacred texts, he placed himself outside his time, and reviled the books of the people; and if his moving words in his life could take the places of these material images, after him the monastic order would have lost one of its most powerful means of influence, if it had entirely adopted the principles of the abbot of Clairvaux. It was not so, and the 13 th century had scarcely commenced, when the Cistersians themselves, forgetting the severe rule of their order, called on painting and sculpture to beautify their edifices.

to the offices; D is the cloister, on which opens a pretty ha hall E in which after laudes the religious assemble to receive orders concerning the distribution of the work for the day. The dormitory was above; at F are the refectorw and kitchen; at G the cellars, barns and agricultural buildings. A court H opened at I to the fields and was intended to contain the stables and wagons required for work in the fields. The cloister enclosure was entered by a gate K. The brother porter was probably lodged in a cell at L. The traces of these last structures are scarcely visible today. At M was the sacristy with doorway to the garden. A small brook passed at the north of t the oratory, and an enclosure contained at N the special garden of this little monastery. Here (12) is an elevation on the side of the apse of the chapel, which gives an idea of t these structures, whose extreme simplicity lacks neither grace nor style. The entrance of the hall E is charming, and recalls the Cluniac structures of the 12 th century.

One understands how vast and richly endowed establishments, such as Cluny, Jumieges, S. Denis, Vezelay, Citeaux, Clairvaux, devoted to the construction of their buildings unusual care and investigation; but when he sees that this care and respect, let us say, for the monastic institution extends to the most moderate structures, even to the most limited rural buildings, he feels an admiration for that Benedictine organization, which covered the soil of western Europe with establishments b both useful and well conceived, in which true art, the art t that knows how to do only what is necessahy, but to do all that it should, was never forgotten. One is accustomed in our age to regard art as a superfluity, that the rich alone can allow themselves; our colleges, school houses, hospitals, seminaries, appear in the eyes of certain persons to not fulfil their purposes, unless they are cold and miserable in appearance, repulsive, deprived of all art feeling; ugliness seems imposed on our programmes of educational establishments or for public u-utility; as if this were not one of the most powerful means of civilization, to accustom the eyes to the sight of things suitable and at the same time beautiful; as if something were gained by placing youths and the lower classes in the midst of objects, that do not speak to the eye, and leave only a c cold and gloomy memory. From the moment that political equal-

hospitable brother. These villas were not always furnished w with chapels, and their inhabitants must go to the chuzches of the neighboring abbeys or priories to hear the offices.

Conformably to the statutes of the order, that a villa or barn must be placed at a certain distanse from the mother abbey, to take the name of abbey, and that it must suffice for the maintenance of at least thirteen religious. When rural e establishments only possessed revenues too moderate to support thirteen religious, they retained their title of villa or simple barn.

Note 1. p. 276. Annales cist. Vol. 3. p. 440; vol. 4. p. 370.

The Benedictine order of Cluny possessed secondary establishments that corresponded to the Cistersian barns; they were t termed obediences. [2] These little establishments possessed all that constitutes the monastery; an oratory, a cloister with its dependencies; then around an adjacent open court the buildings intended for cultivation.

Note 2. p. 276. Du Cange. Gloss.

It was to the obediences that were sent for a longer or shorter time monks, who had committed some fault and must suffer penance; they found themselves subject to the authority of a prior, condemned to the hardest manual labor, fulfilling the functions confined to farm hands in the great establishments. Most of these rural domains long since became farms abandoned to the hands of laymen, for indeed before the revolution in the last (18 th) century, monks were no longer subject to these corporal penances, still we have seen a certain number, whose buildings are still well preserved.

Near Avallon, between that city and the village of Savigny, in a fertile valley lost in the midst of forests and meadows, one may still see rise a charming oratory of the end of the 12 th century with the ruins of a cloister and its dependencies. We give (11) the plan of that obedience, which has retained the name of priory of S. John of Good Men. At A is the oratory, whose nave is covered by a pointed tunnel vault built of bricks and 16 inches thick, the rest of the entire structure being in good stone, well cut and jointed. A very simple gate B, yet of beautiful character, permits strangers or colonists of the vicinity to attend the offices without entering the cloister; a second gate C serves the religious as entrance

sheds. The other services of that establishment have now disappeared. The monastery of Fontenay is situated in a narrow and wild valley, with the most picturesque appearance; large ponds arranged by the monks on the stream at the east above the monastery still supply power for numerous workshops, such as mills, fulling mills, sawmills, in buildings where one finds many fragments from the 12 th century. Fontenay was practically an industrial establishment, just as Pontigny was an agricultural establishment. Above the monastery are found considerable traces of slag, that gives reason for assuming that t the monks had established forges around the religious house. We have previously seen that farm houses were established in the vicinity of the great abbeys for the culture of the land, that soon increased the domains of the religious. Thise farm houses retained their primitive name of villa; they were large farms occupied by lay brothers and farm hands under the direction of a religious with the title of hospitable brother, for in these villas as in the simple isolated barns themselves, hospitality was ensured to the delayed traveler; for this purpose a lamp burned all night in a little niche formed above or beside the gate of these rural buildings, as a beacon intended to guide the pilgrim, and to restore his courage. [2]

Note 1. p. 274. This plan was communicated to us by M. Herard, architect, who made important drawings of this abbey, ac-accompanied by an excellent description, to which we refer o our readers. These drawings are today the property of the Ministry of State.

Note 1. p. 275. Fontenay belongs today to the descendants of the celebrated Montgolfier, the monastery has become an i important paper mill.

Note 2. p. 275. Annales cist. Vol. 2. p. 50.

Here then (10) is one of these farm houses, a dependance of Clairvaux, it is added to the plan of the monastery previously given, and is named Villa Outrabe. At A is the principal gate of the enclosure, traversed by a stream B; two immense barns are built at C, one having seven aisles' one of these barns has its entrance outside. In a special enclosure D are arranged the buildings inhabited by the lay brothers and farm hands, at E are the stables and sheds. Another gate opens at the end F opposite the first, and there is the lodging of the

about 4,343 acres of forest, they had planted vines at Chablis, Pontigny, S. Bris; maintained 60 acres of fine meadows, three mills, a tileworks and numerous estates. [1]

Note 1. p. 273. The church of Pontigny and the barn at the entrance are still preserved; this church, although of a simplicity slightly Puritan, does not fail to be very beautiful; we do not know whether there ever existed a tower over the t transverse aisle; no traces of it remain.

Like Pontigny, the abbey of Vaux-de-Sernay in the diocese of Paris was a purely agricultural establishment; founded in 1128 (9), it did not have the importance of the establishments of Clairvaux, Morimond or Pontigny, but one finds in this plan the simplicity of arrangement and the regularity of the edifices produced by Citeaux; always the four chapels opened east of the transepts, and a rectangular apse as at Citeaux. At A is the church; B is the cloister; C the refectory, placed at right angles to the cloister agreeably to the plan of Citeaux, and contrary to the monastic customs adopted by other rules. The kitchen and the warmed room were near by. The great building prolonging the transept contained in the ground story t the chapter hall, sacristy, parlors, etc.; at the end were p privies; above was the dormitory. Near the entrance as at Pontigny existed a large barn; at E was a mill; The dovecot D, that we have added to this plan, was found at a distance from the cloister in the vast dependencies surrounding the abbey. [1] But here now is an abbey of the third class of the order of Citeaux, Fontenay near Montbard. (9 bis). The church A is extremely simple in construction, its apse is rectangular and without chapels, and four square chapels open from the transepts; this arrangement always appears in the churches of the rule of Citeaux, as may be seen, as well as the enclosed porch before the nave. The cloister C is placed at the south, the stream H being on that side of the church. At F was the chapter hall, then the refectory, kitchens and warmed room with its fireplace; at D are the dormitories; but these structures were removed in the 15 th century. At the origin the dormitory was placed according to custom, attached to the transept of the church, so as to facilitate access of the monks to the c choir for the night offices. Along the stream were established the barns, cellars, etc. The gate is at E with the stables and

cloister is situated north of the church, but this arrangement can be explained by the location of the ground. It was necessary for the services of the monastery, conformably to the c customs of Citeaux, to be near the little river running from east to west, and the church could not be erected on the right bank of that stream, because it is marshy, while the left bank offered good ground, hence the cloister must necessarily be between the church and the stream, only being possibly built north of the nave. Besides the cilmate is much less severe at Pontigny than at Clairvaux and Citeaux, and the southern orientation of the cloister was less necessary. B is the primitive oratory still preserved, D the chapter hall; E the great refectory; F the kitchen and its dependencies with its little separate court at the stream; G is the warmed room; H the house of the novices; I the presses; K the sacristy,; L the barns with lodgings of the lay brothers near them, outside the closure of the religious, as at Citeaux and Clairvaux. The l lodgings of the abbot and of guests, as well as the dependencies were at the west near the first entrance of the monastery. M is the chapel of S. Thomas a Becket, who was compelled to take refuge at Pontigny, as everyone knows. A great basin for ablutions was placed in the middle of the cloister. Vast gardens surrounded that establishment and extended to the east of the church.

Copared to Citeaux and Clairvaux, Pontigny is a monastery of the second rank, and yet its affiliations extended in France, Italy, Hungary, Poland and England; thirty houses were placed under its jurisdiction, all founded between 11119 and 1230. Among these houses we shall cite those of Condom, Chalis, Pin, Cercamp, S. Leonard, in France; S. Sebastiano, S. Martin of Viterbo, in Italy; S. Croix, Zam, Kiers in Hungary, etc.

It does not appear that the abbey of Pontigny was ever surrounded by strong walls like its mother at Citeaux and its s sisters at Clairvaux and Morimond.; it was an establishment exclusively agricultsral, and we no longer find there the little cloister reserved for literary work' no school, no cells for copyists and no great library. The monks of Pontigny indeed soon converted the desert and marshy valley, where they established themselves, into a rich territory, that has become one of the most fertile valleys of Auxois; they possessed ab-

The guests ordinarily ate with the abbot, who for this had a table separate from that of the brothers. After compines two brothers, designated weekly for that office each Sunday in t the chapel, came to wash the feet of the traveler.

Note 3. p. 270. This plan was copied from the Topog. de la France. Bibl. Imp. Estamp. These buildings were entirely changed at the beginning of the last (18 th) century.

Note 4. p. 270. Jul. Paris. Espr. primit. de Cit. Sect. 10, 11. De l'off. du portier, Hist. de l'abb. de Morimond, by abbe Dubois.

From the first entrance one passed into a court A, around which were placed barns, stables, etc., then a great building G containing cellars and lodgings of the lay brothers, who did not find themselves within the enclosure reserved for the professed religious. At H was the lodging of the abbot and of his guests, likewise outside the cloister; at the north the church, to which the lay brothers and the guests went by a separate gate at S. B is the great cloister; K the refectory; I the k kitchen; M the dormitories and their stairway L; C the little cloister and P the cells of the copyists, as at Clairvaux with the library above; R the great infirmary for the aged, unable to devote themselves to active labor and the sick. An enclosure surrounded all the buildings, gardens and the streams destined to water them. It is seen that the article of the constitution of the order concerning the arrangement of the buildings was scrupulously executed. On the church a single spire of modest appearance rose from the middle of the transepts, and sufficed for the small number of bells necessary for the monastery; but at Citeaux the apse terminated in rectangular form, and in that the choir of the church of Clairvaux, built during the second half of the 12 th century, differed from t the mother abbey.

The abbey of Pontigny was founded in 1114, a year before t that of Clairvaux, in a valley of the diocese of Auxerre, until then uncultivated and desert, and seems the second to have ado ted in the plan of its church about the end of the 12 th century an apse with radiating square chapels; here (8) is the plan of the abbey. Just as at Clairvaux and Citieux the transepts had four square chapels. The church A is preceded by a low porch opening externally by an arcade. Here the great cl-

necessary things; namely water, a mill, a garden, shops for various trades, so as to avoid ned for the monks to go outside." The church must have great simplicity. "Sculptures and paintings are to be excluded from it; the glass may only be of white color without cross or ornaments. [1] There must not be built towers of stone or of wood of immoderate height for bells, thus not being in accord with the simplicity of the order. All the monasteries of Citeaux will be placed under t the invocation of the holy Virgin. Barns or farm houses will be distributed over the ground possessed by the monastery, t their culture is entrusted to the lay brothers aided by the farm hands. Domestic animals will be bred, only as they may be useful. Herds of large and small beasts will not go more than a day's journey from the barns, each of which will not be built less than two leagues from Burgundy. [2]

Note 1. p. 270. There still exists indeed in the great abbey church of Pontigny white glass from the date of its erection, whose leads alone form a design in a beautiful style, as one would make a simple drawing on an uncolored surface. (Art. Vitrail).

Note 2. p. 270. See Notice sur l'abbaye de Pontigny, by Baron Chaillon des Barres. 1844.

We give (7) the cavalier view of the abbey of Citeaux, the head of the order, it is easy to see that the arrangements of this plan have been copied at Clairvaux. [3] O is the first entrance reached by an avenue of trees; a cross indicated to t the traveler the gate of the monastery. A chapel D is built beside the entrance. As soon as the brother porter heard a k knock at the gate, he rose saying "Deo gratias" (Thank God) [4] thus giving thanks to God for the arrival of a stranger, in opening he pronounced only this word; "Benedicite" (Bless you), placed himself on his knees before him, then went to inform the abbot. However serious his occupation, the abbot came to receive whom heaven had sent him; after prostrating himself at his feet, he led him to the oratory; that custom explains the purpose of that little chapel located near the gate. After a brief prayer, the abbot entrusted his guest to the hospitable brother, charged with learning his needs, providing his food, and with that of his horse, if he were mounted. A stable for that purpose was placed near the great internal gate 7.

the religious, that they should not glory in their knowledge, the vivacity of their intelligence and the success they could win among their brothers, the infirmary, the asylum of the a aged with minds and bodies enfeebled by age and labor was found near the intellectual centre of the monastery. Between that hall and the lower story of the dormitory were placed privies along the stream. Beside the great hall K is a little chapel, designated by the name of the chapel of the counts of Flanders.

Certainly this plan is far from satisfying the academic requirements, to which in our days it is believed that good sense and the best drawn programmes should be sacrificed; but if we take the trouble to analyze it, we shall remain impressed by the wisdom of its arrangement. The material needs of the life, barns, cellars, mills, kitchens are in the vicinity of the cloister, but still remain outside the enclosure, so that the vicinity of these services could not disturb the professed religious. At the south of the church is the cloister, surrounded by all the dependencies to which the religious must easily pass, each of these dependencies occupies the area of ground suited to it. Besides, a smaller cloister appears reserved for intellectual labors. If we cast our eyes on the general plan (5), we see the workshops, the great barns, stables, lodgings of artizans are arranged in a first enclosure outside the religious enclosure, without symmetry, but according to the ground, streams and orientation. A third enclosure at the east comprises gardens, orchards, irrigating ditches, etc. F Finally the entire establishment is enclosed within walls and streams able to protect the abbey against a sudden attack.

Of all these buildings so well arranged and built in a fashion to last until our days, there remain only fragments, the abbey of Clairvaux was entirely rebuilt in the last (18 th) century and only presents slight interest. This abbey had the greatest similarity to the mother abbey. Most of its arrangements are copied from those of Citeaux. The constitution of the order was definitely revised in 1119 in an assembly, that took the name of the first general chapter of Citiaux, by Hugues of Macon, S. Bernard and ten other abbots of the order, and is a veritable masterpiece of organization, stating in r regard to buildings:-- "The monastery will be constructed (if possible) so that within its enclosure shall be collected all

complete seclusion for the professed religious, if it seemed good. At the south of the little cloister is seen a great hall, a school or rather the place of assembly of the monks, intended for the conferences customary in the order of Citeaux. T These conferences were actual theological disputes, at that time when scholastics was already introduced into the study of theology, and indeed on the original plan this place is d designated as "hall for disputes."

Note 1. p. 264. The lay brothers differed from the professed brothers in that their vows were simple and not solemn. They were servants that the Cistercians could add with the permission of the diocesan bishop. At an epoch when the monasteries were full of religious of noble families, the lay brothers w were taken from the laborers and artizans; they always wore a regular costume, and ate at the common table of the refectory. It is understood, that in the time when the condition of the country people was as miserable as possible, the Cistercian monasteries could not lack lay brothers, who by entering the cloister thus found safety, comparatively great liberty and an assured existence.

Note 1. p. 265. Citeaux quickly attained the incredible number of two thousand monastic houses for both sexes; each house possessed five or six barns. (Histoire de l'abbaye de Morimont, by abbe Dubois. 2 nd edition. 1852; Annales de l'ordre de Citeaux; Essai sur l'histoire de l'ordre de Citeaux, by D. P. de Kein. 1696.

Note 2. p. 265. We owe this plan to the courtesy of M. Hammond, librarian of the city of Troyes, and of M. Millet, architect of that diocese, who was indeed willing to furnish us with a tracing.

Note 1. p. 268. Place of talking.

Note 2. p. 268. Room for warming.

It is conceivable, that hard manual labor and numerous relicious duties could not entirely satisfy the intelligence of men collected in great numbers, among which were counted distinguished personages, both by their rank and by their literary education. Around the little cloister was then grouped w what was intended for the intellectual nourishment of the monastery: the library, cells of the copyists, the hall in which theological subjects were discussed; and as if to recall to

eastern end and are watered by ditches. Here (6) is the plan of the buildings reserved for the religious. It will be noticed at first, that the church A ends at the apse in nine square chapels. Four other eastern chapels open on the transepts; besides the stalls of the religious placed before the crossing, other stalls are placed just inside the entrance to the nave; these stalls were probably reserved for lay brothers. B is t the great cloister with its covered lavatory, a great basin in a single piece furnished with an infinity of little gargoyles around it (Art. Lavabo). C is the chapter hall looking on a little garden. D the parlor of the monks; [1] the most absolute silence must be observed among the religious, a special place being reserved for the necessary conversations, so as not to excite scandal among the brothers. E is the heated room; [2] there only after chanting the laudes at sunrise the religious, chilled during the offices of the night, went to warm th themselves and grease their sandals before going to the morning labor. F the kitchen with its little service court, its stream T, a laundry and pantry in proximity. G the refectory, is placed opposite the great basin for ablutions. H is the c cemetery and north of the church. I is the little cloister w with eight cells reserved for the copyists, lighted from the north and opening at the middle on a portico of this cloister. K is the old lodging of strangers. N the old lodging of the abbot. O the cloister of infirm aged men. P the hall of the abbot. Q the cell and oratory of S. Bernard. R are the stables. S are barns and cellars. W are a saw mill and oil mill, moved by the stream T. V is a shop for curriers. X is the sacristy. Y the little library, where the brothers deposited their books for reading. Z a ground story over which was the dormitory, reached by a short stairway in the corridor beside the parlor D. Above that parlor was arranged the great library, to which one ascended by a stairway opening into the south transept of the church. That stairway also led to the dormitory, so that the religious could descend directly to matins in the church. From the narrow porch of the church one passed to the kitchen and its dependencies without entering the cloister, by an alley along the barns and cellars; this alley was accessible to wagons by a wagon gate opened at the right of the porch. Thus easy communication with the exterior for the services and a

more than Cluny will come to the aid of the poor, not only by alms, but by employing them; and its gifts sent from monasteries simple and austere in appearance, distributed by monks devoting themselves daily to the hardest labors, will seem m more precious because not appearing to be the abandonment of superfluity, but the sharing of necessaries. Not on elevated places were founded the Cistersian monasteries, but on marshy valleys along streams; there cultivation can fertilize the s soil by converting unproductive swamps into meadows watered by streams; there can be found a motor force for shops, millsl oil works, sawmills, etc. citeaux, la Ferte, Clairvaux, Morimond, Fontenay, Abbey du Val, are built in deep valleys, and still today around those ruined establishments are found at every step traces of the vast labors of the monks, either to retain water in vast ponds, to direct it into suitable canals for irrigation, or to bring it to the mills. As an example of what we state here, and to give an idea of a Cistersian monastery at the end of the 12 th centurw, here (5) is the general plan of the abbey of Clairvaux founded by S. Bernard. [2] One will note at once, that this plan is divided in two distinct parts: the more important is that of the east, enclosing the buildings assigned to the religious; at A are placed the church and two cloisters, details of which are given later; at B are ovens, mills for grain and oil; at C is the cell of S. B Bernard, his oratory and garden are religiously preserved; at E are fish ponds fed by the pond; at F the lodgings of guests; at G the residence of the abbot near the entrance and the inn; at H the stables, at I the press and hay barn; at Y the stream of water, and at S is an oratorw. The principal entrance of the abbey is at D. The part of the plan located at the west and separated from the former by a wall, comprises the dependencies and the lodgings of the lay brothers attached to the abbey. T is a garden (for walking). K is the parlor. L are lodgings and shops of artizans. M is the shambles. N are barns and stables. O are public presses. P the principal entrance. R are the ruins of the old monastery. V is a tile works. X is its kiln. Streams circulate in the midst of these different buildings and shops. A general enclosure furnished with some wathctowers surrounds the entire monastery as well as its dedendencies; kitchen gardens and orchards are located at the

can even scarcely preserve life, that they undertake labors which the most robust country people find very heavy and difficult to bear, and sometimes suffer the heat of the sun, sometimes rain, the snows and ice of winter? If the religious receive lay brothers, [1] this was not to be obliged to leave the enclosure of the monastery, and so that these brothers c could be engaged in external affairs." S. Robert and his companions in founding Citeaux already understood, what a hold on secular powers was given by the rule of S. Benedict in t the hands of the rich establishments of Cluny; also with what rigor these founders rejected donations, that only tended to relieve them of a portion of their hard labors at the detriment of their independence; only retaining the ungrateful soil that scarcely fed them, so as to be a charge to nobody, "for," adds the author already cited, "it is that they fear the world most."Yet Eudes, duke of Burgundy, erected a castle in the vicinity so as to be near the religious, that he had aided by his gifts in the construction of their oratory; his son Henry soon desired to share their labors and become a monk. But Citeaux only made a great advance when S. Bernard and his companions came to remain there; from that moment a new militia presented itself to relieve that furnished by Cluny a century earlier. From the nearby forest where the twenty-one religious of Molesmes built some wooden huts, and cultivated some bit of land, came in less than twenty-five years more than sixty thousand Cistersian monks, who scattered from the Tiber to t the Volga, from Mancanarez to the Baltic. These monks were c called to all sides by feudal lords to clear abandoned lands, to establish workshops, raise flocks, drain swamps, and will lend the papacy the most powerful assistance by their union, by the order of their most celebrated chief; to royalty and to the people by the restoration of agriculture; for in their midst and under the same habit one will see powerful nobles guide the plow beside the poor colonist. Citeaux will take t thousands of arms from war to fill its eight or ten thousand barns. [1] Its labors will not stop there, but its immortal representative will preach the second crusade; Citeaux will defend Europe against the Moors of Spain by the formation of the military orders of Calatrava, Alcaotara and Montesa. The Templars will request rules from S. Bernard. Citeaux even more

understand property in any other form; the most illustrious abbots of Cluny had felt that this slope was slippery, and during the 11 th and 12 th centuries by successive reforms, they had attempted to take from monastic property its feudal character; but customs were stronger than reforms, and Cluny House appeared impenetrable by its constitution, importance, personal influence belonging to the order, the papal bulls i and its wealth, was attacked on the only side, that gave its superior lord the means of interfering in its affairs; and this vulnerable side was the feudal rights of the abbots.

In the last years of the 11 th century, three religious of Molesmes, Ss. Robert, Alberic and Etienne, after being forced to reform their abbey, which had fallen into the greatest relaxation, went to Lyons in company with four other brothers to find Archbishop Hugues, legate of the Holy See, and explained to him, that they desired to found a monastery in whice the rule of S. Benedict was followed with the greatest rigor; the legate praised their zeal, but directed them to undertake that task only in company with a greater number of religious. In fact fourteen brothers soon joined them, and having received the favorable judgment of the legate, they left Molesmes together, and went to establish themselves in a forest named Citeaux, located in the diocese of Chalons. This was one of the solitudes, which then covered a great part of the soil of Gaul. The viscount of Beaune left this desert to them. The l little colony began to work and soon erected what the Cistersian annals term the monastery of the woods. This place was damp and marshy; the oratory was built in a year from 1098 to 1099, which was only a poor chapel. The twenty-one religious at the origin had neither constitution nor special regulations, and they adhered literally to the rule of S. Benedict; it was a little later that S. Alberic revised the statutes. "The new solitaries must live by the work of their hands," says the a author in the annals of the order, "without ever failing in the duties to which they were devoted as religious. S. Peter of Cluny," adds that author, "reflecting upon their life, not only believed it difficult, but even impossible for human powers. How can it be," he cries, "solitaries overwhelmed by fatigue and labor, who nourish themselves only with herbs and vegetables, who do not maintain the powers of the body, and

the country, not allowing them to be surrounded on every side. At Paris abbey S. Germain des Pres possessed a vast extent of ground situated at the east of the monastery, and it was necessary for the city to extend greatly to pass these meadows, that extended beyond the street du Bac. The abbey of Moissac had its fortified enclosure, separated from the enclosures of the city by a common street. It was the same at the abbey of S. Remy of Rheims and that of S. Denis; the abbeys of Trinite and S. Etienne at Caen (4) found themselves in a similar situation. [1] Also it frequently happened, that the monasteries built at a lertain distance from populous cities were gradually approached by private buildings; then in time of war the enclosures of these monasteries were included within the new fortifications of the cities; thus at Paris the priory of S. Martin des Champs, the Cistersian, the Temple, the abbey of S. Genevieve, S. Germain des Pres, White Cloaks, were successively comprised within the walls of the city, although these establishments had originally been outside the walls.

Note 1. p. 262. The cavalier view of abbey S. Etienne of C caen here given is copied from an engraving in the Topographie de la Gaule (Normandie) published by Merians. Frankfort. 1662. Also see the Monog. of Lib. S. Genevieve.

As landed proprietors, the religious orders possessed all the rights of feudal lords, and that condition contributed n not a little to their decadence when the royal power on one hand, and the privileges of the commune on the other, took a great importance; they were often placed, except by special exemptions admitted only with difficulty by the superior lord, under obligation to furnish men in time of war or to keep a garrison. At the end of the 12 th century, when the monarchy was predominant, the great religious establishments, that were at first humble and then rose in opposition to feudalism and absorbed the castle, were then appropriated in their turn by the monarchical unity; but at that moment of their passage fr from the purely monastic state to that of feudal proprietors, i.e., under the reign of Philip August and of S. Louis, they surrounded themselves with fortified walls. Every institution always holds to the time when it flourished. The monastic institution, from the moment that it became the possessor of l lands, necessarily became a feudal power, for men did not then

gardens with great fish ponds. A chronicle of the abbey dates back to the government of S. Hugues "the construction of an immense refectory at the south of the cloister. This refectory was 100 ft.long and 60 ft. wide, contained six rows of tables without counting three other transverse tables intended for officials of the community. It was ornamented by paintings r representing the memorable histories of the Old and New Testaments, portraits of the principal founders and benefactors of the abbey. At one end a great painting represented the last judgement."[1] This custom of painting the scene of the last j judgment in the refectory of the rule of Cluny was frequent; some time since could be seen traces of one of these representations in the refectory of the abbey of Moissac, now destroyed to allow passage of the railway from Bordeaux to Toulouse.

Note 2. p. 259. Apocolypse.

Note 1. p. 260. Hist. de l'abbaye de Cluny. Lorain.

The city of Cluny, built south of the abbey on the slope of a hill inclined toward the church, still contains a great number of charming houses of the 12 th and 13 th centuries; it was enclosed by walls about the end of the 12 th century by the abbots, and in recognition of this service, the city agreed henceforth to pay tithes to the monastery. Besides the t two towers of the narthex, the church of Cluny possessed three towers set on its first transept and a tower on the middle of the second transverse aisle, that was termed the tower of the lights, because it contained at its base crowns of lights, t that burned perpetually over the great altar. It is not doubtful that the abbey was surrounded by fortified walls before the construction of the city walls, and when this formed a p part of the monastery, so to speak. The singular abbey of Tournus, whose plan is here given (3), was surrounded by walls enclosing the ramparts of the city on the north side and possessing separate defenses on the south side within the city itself. [1] A charter of Charles the Bald thus designates Tournus:-- "The castle, city of Tournus and the sacred enclosure of S. Valerian." These divisions were frequent in the middle ages, and when the monasteries were near cities, either because they were established near already existing cities, or b because lay habitations successively gathered around them, t they always took care to reserve an open side looking out on

as also in the tympanum of the south doorway of the abbey of Moissac, Christ seated and holding the gospel and blessing; around him were the four evangelists and four angels supporting the ovoid glory by which he was surrounded. The immense n nave was bordered by double side aisles as at Church S. Sernin of Toulouse; it had a round tunnel vault. Above the entrance doorway, in the thickness of the wall separating the narthex from the nave and forming a corbelling of 6.6 ft. in the interior, was constructed a chapel consecrated to S. Michael, r reached by two winding stairways. We have seen that at the abbey of S. Gall (Fig. 1) a little circular chapel elevated above the ground was likewise dedicated to S. Michel. At Vezelay, at the cathedral of Autun is a niche over the portal, in which could be placed an altar. It seems that this arrangement belonged to Cluniac churches; in any case it merits mention, for we find it again at S. Andoche of Saulieu; in the church of Montreal near Avallon, in the form of a gallery with its altar still in place (Art. tribune). But what characterizes t the great church of Cluny is this double transept, of which no other church in France gives us an example. At D is the p principal altar, at E the rear altar, at F the tomb of S. Hugues, who died in 1109. The great number of religious that o occupied Cluny at the end of the 11 th century explains this arrangement of the transepts; indeed the stalls must have extended from the entrance of the eastern transept to the tomb of Pope Gelasius at G, and thus enclosed the two transepts of the first cross aisle. The second transept was reserved for worship at the entrance and departure of the religious; and the two transepts of the first transverse aisle behind the s stalls were reserved for the service of the four chapels opened at the east, perhaps also for the numerous guests, that t the abbey was often compelled to lodge, either during great assemblies or during the stay of popes or of sovereigns. On the south side was a vast cloister surrounded by buildings, traces of which are still found at O and I. -- K and L were two abbey buildings rebuilt at the end of the 15 th and beginning of the 16 th centuries; M was a bakery still existing; S and N were structures rebuilt at the beginning of the last century on the sites of primitive structures; P was the parish church; T the street beside the enclosure of the abbey; V the

of justice, the prison; that of the north was reserved for t the care of the archives. It does not appear that the Cluniac churches were preceded by porches of this importance before the 12 th century. The narthex B of Cluny dated from the first years of the 13 th century, those of Charite-sur-Loire and of Vezelay were built in the 12 th. Yet at Vezelay there existed a porch erected at the same time as the nave at the end of t the 11 th or the beginning of the 12 th centuries, but it was low and of small depth. It is difficult to know exactly the use for this ante-nave ; an absolute necessity must have compelled the religious of Cluny about the middle of the 12 th century to adopt that arrangement, for it develops suddenly and assumes great importance. At Cluny, Charite and Vezelay, the narthex is an actual church with side aisles, triforium and its two towers. At Vezelay the triforium returns above t the entrance of the internal nave, and thus becomes an actual gallery on which was placed an altar in the 12 th century in the central niche originally forming one of the openings lighting the western gable. (Art. Architecture Religieuse, Fig. 22). Was this vestibule destined to contain the attendants of the noble visitors received by the monks, or the numerous pilgrims visiting the abbey at certain periods of the year? Was it a narthex reserved for penitents? The last hypothesis seems to us most probable; one text supports it; in the ancient pontifical (ritual) of Chalon-sur-Saone near Cluny may be read; "in some churches the priest by order of the bishop celebrates the mass on an altar very near the doors of the temple, for the penitents placed before the portal of the church.[1] At Cluny itself near the left entrance portal and in the vestibule before the revolution was still seen a stone table four feet long by two and a half wide, that might pass for an altar of the 12 th century. [2]

Note 1. p. 258. This plan is at the scale of 1\2000 full size.

Note 1. p. 259. See Latin text from Lorain.

Note 2. p. 259. The same.

From the vestibule was entered the great church by a round arched doorway, whose lintel as at Moissac probably represented the twentyfive old men of the vision of S. John, [3] although the descriptions only mention twenty-three figures. Above in the tympanum was sculptured in colossal lines, as also in

sick, and to give them bread, wine, and everything better that he could." Udalric adds in the year he wrote his "customs" w were distributed two hundred fifty hams, and alms were given to seventeen thousand poor. Each monastery dependent on Cluny imitated that example according to its means. If we add to t these occupations, all charitable, the external activity of the monks of Cluny, their political and religious influence, the important affairs they had to treat, the administration of their domains and of the priories dependent on the mother abbey, the instruction of youths, the literary work of the cloister, and finally the performance of numerous religious duties in the day and night, one will not be astonished by t the importance acquired by that House at the end of the 11 th century, an actual government attracting all to itself, great and small, moral influence and worth. Then also the construction of the great church was commenced.

Note 2. p. 256. Udalric. Antiq. Consuet. Book 3. Chap. 24. We borrow this translation from the work of the Abbe Cucherat, that we have had occasion to cite many times. The "ancient c customs of the Cluniac monasteries" of Udalric are found entirely printed in the Spicilegium, Vol. 1. p. 641 et seq. They were collected by the monk Bernard, who abridged them in 426 pages quarto.

From the time of S. Hugues the church of Cluny no longer s sufficed for the number of monks; that abbot undertook in 1089 to rebuild it; the legend states that S. Peter gave its plan to the monk Gauzon during sleep. It was certainly the greatest church of the West. Here (2) is the plan of the abbey as it still existed at the end of the last (17 th) century; [1] unfortunately already at that epoch, as in most great monasteries of the Benedictines, the cloister buildings had been almost entirely rebuilt, but the church was intact. Beginning at the choir by S. Hugues, it was only dedicated in 1131. The narthex was only completed in 1220. A was the entrance of the monastery, a very beautiful portal of the 12 th century with two arches, that still exists. Before the church at R five steps led up to a sort of area, in the middle of which came a stone cross, then one found a grand flight of steps interrupted by wide landings, that descended at the entrance of the narthex, flanked by two square towers; the southern tower was the seat

things never comprised abuses would be an exaggeration; but in the midst of a society so divided and disordered as that of the 11 th century, it is certain that the monastic establishments were an immense benefit, the only one practicable. That is not all, for the monasteries in a time when roads weer unsafe, were an assured refuge for the traveler, who never k knocked in vain at the door of the monks. Those who have visited the East know how precious is the hospitality given by the monasteries to all comers, but how much more efficient and magnificent in particular would be that found in houses like Cluny or Clairvaux. On this matter, permit us to cite here a passage from Udalric:-- [1] "As the guests on horseback are received by the custodian or guardian of the inn, so travelers on foot were met by the almoner. To each one the almoner gave a pound of bread and a sufficient measure of wine. Besides, at the death of each brother for thirty days his portion was given to the first poor man, that presented himself. Also meat was given to him as to the guests, and to these a denier at the moment of departure. Every day were reserved eighteen portions intended for the poor of the place, to which were given also a pound of bread; for a pittance broad beans four days in the week, vegetables the other three days. At g great festivals and twenty-five times per year, meat replaced the bread beans. Each year at Easter were given to each one nine ells of woolen cloth, and at Christmas a pair of shoes. Six religious were engaged in this service, the steward, who made the distribution to the poor and the guests, the porter of the almonry; two went each day into the forest with their axes; the two others were in charge of the oven. Extraordinary alms were distributed on certain anniversary days and in memory of some illustrious personages, such as S. Odilon, emperor Henry, king Ferdinand (son of Sancho the Great, king of C Castile and Leon, who died Dec. 27, 1065) and his wife, and the kings of Spain. Each week the almoner washed the feet of three poor men with warm water in winter, and he gave to each a pound of bread and the pittance. Besides each day were distributed twelve tarts, each of three pounds, to orphans and widows, lone and blind, aged and all the sick, who presented themselves. It was also the duty of the almoner once a week to travel over the domain of the abbey, to inquire about the

[illegible] Nos. 48, 49.

From our days justice has been rendered to the Benedictines, and serious authorities have scrupulously ~~enumerated~~ immense the services rendered to agriculture by the Cluniac and Cistersian establishments; everywhere that Cluny or Citeaux founded a colony, land became fertile, pestilential swamps changed into green meadows, forests were regulated, and slopes were covered by vineyards. Who does not know that the best woods, richest harvests, most precious wines come today from lands taken from the monks? Scarcely were the oratory and the little cells of the Benedictines erected in the midst of a desert, than houses grouped themselves around them, since as the abbey or priory became richer, the hamlet became a great village, then a market-town, finally a city. Clugy, Paray-le-Monial, Marcigny-les-Nonains, Charlieu, Vezelay, Clairvaux, Pontigny, Fontenay, Morimond, etc., have no other origin. The city contained industries instructed by the monks; tanners, weavers, clothiers and curriers, supplying the abbey at wages with the products made from its flocks without fear of lack of work, the curse of our modern manufacturint cities; their children were brought up gratis at the abbey, the infirm and aged were cared for in well arranged and well built hospital houses; frequently the monasteries erected works for smelting and working metals; then smiths, charcoal-burners, even goldsmiths came to settle around the monks, and if there came a year of dearth, if war desolated the fields, the vast granaries of the abbey opened for the workers without bread; charity did not wrap itself in the cold mantles of our modern establishments, but accompanied its gifts with consoling words, and was always present there, personified by the Church. Not content with giving the remedy, it applied this itself, followed its progress, recognized the patient, his family and condition, and followed him even to the tomb. The peasant of the abbey was attached to the soil like the peasant of the secular lord, but then far from complaining from that condition, near slavery politically speaking, he derived from it protection and perpetual assastance for h himself and his children. What we have seen established in t the 9 th century in the domain of a villa (plan of abbey of S. Gall), extended in the 11 th century over a vast territory, or filled the walls of a city. To state that this condition of

daughters of Cluny, he caused the customs of his monastery to be drawn up by Bernard, one of his learned disciples; [1] he f founded at Marigny a convent for women in which a great number of illustrious ladies soon took refuge, Matilda of Bergamo and Gastonne of Plaisance; Veraise and Fredeline of the royal bl- ood of Spain; Maria, daughter of Malcolm of Scotland; the sis- ter of S. Anselm of Canterbury; Adele of Normandy, daughter of William the Conqueror; Matilda, widow of Stephen of Blois; Hermingarde of Boulogne, sister of that princess, and Adeline of Blois, her daughter. Among so many personages, Aremburge of Vergy, mother of S. Hugues, also retired to the convent of Marcigny. In England, Flanders and even in Spain, this new c community soon had churches and convents dependent on it.

Note 1. Bibl. Clun. in notes of Andre Duchesne. col. 24.

Nothing is comparable to this movement, that manifested it- self in the 11 th century in favor of the regular religious life. Indeed there only could elect spirits find an assured and tranquil asylum, an intellectual existence, order and peace. But men and women, who devoted themselves to the monastic life did not come from the lower classes of society, but on the c contrary, from its upper regions. The heads of the country p passionately entered that course, as the only one that could lead, not only to meditation and religious inspiration, but to the development of the mind, that could open a vast field to the activity of the intelligence.

But one of the great glories of the religious orders, a glo- ry too frequently forgotten by ungrateful ages, was the clear- ing of the ground, the reestablishment of agriculture, since the conquest by the barbarians abandoned to the hands of colo- nists and degraded serfs. No voice was raised at the end of the last century (18 th) to state that those vast and rich d domains possessed by the monks had been arid deserts, wild f forests, or unhealthy swamps, that they had known how to make fruitful. Certainly after the emancipation of the lower class, the existence of the monasteries no longer had the utility, that they acquired from the 10 th to the 12 th centuries; but to whom did the lower class of society in western Europe owe their well-being and the resulting emancipation, if not to t the religious establishments of Cluny and of Citeaux? [2]

Note 2. p. 235. Mabillon, sixth preface of his Acta Sancto-

him; "In such a case," says Mabillon," he always placed one condition, that as the charter expressed it, to not labor in vain, and in the fear that the reformed monastery would soon fall into a state worse than the former." [1] S. Hugues founded the monastery of Charite-sur-Loire; in his time Cluny was an actual kingdom, "its government extended over three hundred and forty monasteries and churches, the abbot general was a temporal prince, who spiritually depended on the Holy See. He coined money on even the territory of Cluny, just like the k king in his royal city of Paris." [2]

Note 1. p. 254. Cluny au XI siecle, by Abbe Cucherat. (See Mabillon. Ann. Ben. Vol. 5. p. 70. (See Latin text).

Note 2. p. 254. Hist. de S. Etienne Harding. p. 264. -- See Essai sur l'hist. monet. de l'abb. de Cluny. p. 8. (25 copies printed). 1842. By M. Anatole Bathreleny.

To govery establishments scattered ofer the entire western territory of Europe, assemblies of chapters were generally f formed; at near and periodical epochs there gathered at the call of the abbot the superiors and delegates of the monasteries from all points in Italy, Germany, France, Aquitaine, S Spain, Portugal, England, Hungary and Poland. "S. Benedict d desired, that in important affairs the abbot should consult the entire community. This wise precaution and species of religious liberty was transferred on a great scale into the vast congregation of Cluny. In the general chapter were to be discussed the interests and the spiritual needs of the cloister, just as the councils did the interests and needs of the Church. An account was rendered of the state of each community; all were grouped by monastic provinces, and the general chapter before separating should name two visitors for each province. Their duty would be to go there to ensure the execution of t the measures ordered in the general chapter, to see the actual state of things, to hear and entertain at need the complaints of the weak, and to regulate all things for the good of peace." [3]

Note 3. p. 254. Cluny au XI siecle, by Abbe Cucherat. p.23.

Thus politically Cluny gave the example of a central organization, that later was followed by the kings. But not content with the oversight exercised by visitors appointel in the general chapter, Hugues wished to see for himself; we follow him in turn to all points in Europe, where were established daugh-

and persons, persons and their goods. Therefore beyond the a accustomed rent, they require from them innumerable services, insupportable and heavy burdens, three or four times a year, and whenever they will. Thus one sees these country people a abandon the soil and flee to other places. But a more frightful thing! Do they not go so far as to sell for money the men that God bought at the price of his blood! On the contrary, when the monks have possessions, they act very differently. They require from colonists only due and legitimate things; they demand their services only for the needs of their existence; they torment them by no exactions and impose on them nothing insupportble; if they see them needy, they feed them with their own substance. They treat them not as slaves or servants, but as brothers. And that is why the monks are proprietors w with good title, a better title than the laity." It is then necessary to see in the vast importance of Cluny in the 11 th century a national movement, a beginning of order and of season, after disorders and pillage. Indeed S. Hugues took part in all the great affairs of his age, just as did later abbot Suger and S. Bernard himself. S. Hugues not only occupied himself in reforming monasteries, even subjecting them to the r rule of Cluny, of watching that the mother abbey increased in grandeur and wealth, that its privileges were maintained, he was concerned in all improvements of his age; kings and princes took him to arbitrate their differences. Alphonse VI, king of Castile, who professed the most lively friendship for him, charged him with founding two Cluniac monasteries in Spain, and he contributed to the construction of the great mother c church commenced by Hugues. William the Conqueror solicited the abbot of Cluny to come and govern the religious affairs of England. Ancient abbeys became dependencies of Cluny during the government of S. Hugues: these are Vezelay, S. Gilles, S. Jean of Angely, S. Peter of Moissac, Maillezais, S. Martial of Limoges, S. Cyprien of Poitiers, Figeac, S. Germain of Auxerre, S. Austremoine of Mauzac and S. Bertin of Lille; while retaining their title of abbot, the superiors of these religious establishments were appointed by the abbot general. "Already five years earlier S. Hugues would not consent to charge himself with the monastery of Lezat, only on condition that the election of abbot be left to him and his successors after

the omnipotence they knew how to acquire, ask themselves if all this terrestrial and intellectual property would then have been more useful to humanity if placed in other hands? Would these have been the secular feudalism, always divided, warring, barbarous and ignorant; or the people that scarcely knew themselves; or the royalty, whose contested power sometimes leaned on the secular arm, sometimes on the ascendancy of the bishops, or sometimes on the people of the cities; who could then combine in one group all the vital forces of a country, coordinate and fertilize them, preserve and transmit them intact to posterity? Certainly not; the religious orders were vowed to celibacy, gathered under a common rule, joined by inviolable and sacred vows, taking charity as a basis, alone capable of civilization, of taking under protection the great and the p people during the minority of nations. The religious orders in the 11 th century had acquired that immense influence and power only belonging to a spiritual chief, because the great and the people understood instinctively the need of that protection, without which all would have fallen into chaos. In fact in the 11 th century, there were but two orders in Europe, the military order and the religious order; and as in this w world moral forces always ended in conquering material force when divided, monasteries must acquire more influence and wealth than castles; they had in their favor the opinion of the people, who in the shadow of the monasteries devoted themselves to their industries, cultivated their fields with more safety than under the walls of feudal fortresses; who found solace for their moral and physical sufferings in those great establishments where all was so well ordered, where prayer a and charity never failed; place of refuge of sick souls, for great repentance, for incurable wounds, for deceived hopes, for work and meditation, for incurable wounds of the heart, for weakness and poverty; in the time when the primary condition of earthly existence was high stature, a heavy arm, shoulders capable of bearing the coat of armor. A century later, Peter the Venerable in a reply to S. Bernard, explains better than we now can the causes of the wealth of Cluny. "Everyone knows," says he, "in what manner secular masters treat their serfs and servants. They are not contented with the ordinary service due them; but they demand without mercy the property

tempted to trespass on the immunities granted to Cluny by the Holy See. "The bishops cannot enter the abbey, visit or exercise their functions there, without being called there by the abbot. They must excommunicate every individual, that troubles the monks in their possessions or their liberty; and if on the contrary, they would place an interdict on the priests, simple laymen, servants, furnishers, laborers, finally on all that live within the limits of the abbey, and who are essential to the physical or spiritual life of the monks, this interdict is void by full right. These charters abound in the cartulary of the abbey; more than forty popes at different epochs conffirm and amplify the ecclesiastical privileges of the monastery. In 1205 Gaudemus, bishop of Macon, denounced to his metropolitan, the archbishop of Lyons, the abbots and religious of Cluny, who troubled the state of the Church from their beginning, to exempt themselves from the ordinary jurisdiction of their diocesan."[1]

Note 1. p. 232. Hist. de l'abbaye de Cluny. By P. Lorain. p. 41 et seq.

The abbot was condemned after a long resistance and submitted. The time had not yet arrived, when the papacy could sustain the prilileges it granted; but this first struggle with the episcopal power explains the great interest, that united Cluny and the court of Rome some years later.

At twenty years, Hugues was already prior of Cluny under Odilon; he was connected by intimate affection with the monk Hildebrand. Hugues, son of Dalmatius, count of Semur in Brionnais, succeeded S. Odilon; Hildebrand became Gregory VII. Both, in that time so near barbarism, knew how to make a great principle predominate, the spiritual independence of the Church. Gregory VII triumphed over Henry IV by the sole ascendancy of public and religious opinion, and dying in exile, he no less placed the pontifical throne on an immovable base; S. Hugues understood how to remain the friend of his rivals, who filled the 11 th century with their strife. He is the representative of the monastic spirit at its climax in an age, when that spirit was alone capable of civilizing the world by its unity, its independence, its intelligence and the order that directed it. Let those who reproach the Benedictines with their immense wealth, their predominance, their spirit of propagandism, and

in countries." Under his government a great number of monasteries were subjected to the rule of Cluny; among those most important we will cite those of Payerne, diocese of Lausanne; Classe near Ravenna; S. John Evangelist at Parma, S. Peter -in-golden-sky at Pavia; the ancient monastery of Lerins in Provence; S. Peter in Auvergne; Marmoutier, S. Maur-les-Fosses and S. Germain of Auxerre, S. Begigne of Dijon, S. Amand and S. Marcel-les-Chalons.

S. Odilion, designated by Maieul as his successor, was confirmed by 177 religious of Cluny; he gathered under the Cluniac discipline the monasteries of S. Jean of Angely, Flour, Thiern, Talui, S. Victor of Geneva, Farfar in Italy; he carried out the reform of S. Denis in France, that Hugues Capet had asked of Maieul. Casimir, son of Miceslas II, king of Poland, driven from the throne after the death of his father, was under Maieul deacon at the monastery of Cluny; recalled to Poland in 1041, he was relieved from his vows by the Pope, married, reigned, and in memory of his earlier monastic condition, he created and endowed in Poland several monasteries, that he filled with religious from Cluny. It is asserted that his subjects, to perpetuate the memory of that fact, agreed to cut their hair in form of a crown, a symbol of the monastic tonsure. S. Odilon was in relations of esteem and friendship with Popes Sylvester II, Benedict VIII, Benedict IX, John XVIII and Clement II; with the emperors Otho III, S. Henry, Conrad the Salic, Henry the Black; with the empresses S. Adelaide, the kings of France, Hugues Capet and Robert, those of Spain, Sancho, Ramir and Garcias, S. Stephen of Hungary, William the Great, count of Poitiers. He founded what is termed the truce of God and the feast of the dead. He built at Cluny a cloister magnificently ornamented by columns of marble, that he caused to be brought by the Durance and the Rhone. "I found an abbey of wood," said he,"and I leave it in marble." But s soon the immense influence assumed by Cluny aroused the episcopate; the bishop of Macon, who saw the monks of Cluny increase in landed wealth, in number and reputation, desired to make them return under his general jurisdiction. In executing the wishes of the lay founder of the abbey, the Popes had successively granted the abbots formal bulls of exemption; they even threatened with excommunication any bishop, who was temp-

Note 1. p. 250. Histoire de l'abbaye de Cluny, by p. Lorain.

These reforms were indeed necessary, for during a long time the abbots and monks had strangely perverted the rule of S. Benedict. Especially during the invasions of the Normans, discipline was lost in the midst of the general disorder, the abbeys had become fortresses more filled with armed men than w with religious' the abbots themselves commanded lay troops, and the monks driven from their monasteries were frequently obliged to change the gown for the leather coat. [2] Yet if after the reforms of Cluny and Citeaux the abbots no longer took part in the armed quarrels of the lay nobles, they did not c cease to occupy themselves with temporal interests, to be called by the sovereigns not only to reform the monasteries, but also as advisers, ministers and ambassadors. Before the great Cluniac and Cistersian associations, the need was felt for a uniting in a group certain important abbeys. About 842 the a abbot of S. Germain-des-Pres, Ebroin and his religious had f formed an association with those of S. Remy of Rheims. Some time before the monks of S. Denis had also made one. By these associations of monasteries they promised themselves friendship and mutual assistance in both health and illness, with a certain number of prayers, that they agreed to make after the death of each religious of the two communities. [3] But under S. Odon and S. Maieul, abbots of Cluny, the reformed rule of S. Benedict proceeded to take entirely new splendor, to furnish men of intelligence and order, who during nearly two centuries should have an immense influence in western Europe, f for Cluny is the true cradle of modern civilization.

Note 2. p. 250. In 898, Ebles, an abbot of S. Denis, was k killed in Aquitaine by a stone at the attack on a castle, that he besieged as captain of a troop of soldiers. (Hist. de l'Abb. de S. Denis, by D. Felibien. p. 100.

Note 3. p. 250. Hist. de l'abb. de S. Germain-des-Pres, by D. Bouillant. p. 30. Paris. 1724.

Maieul governed the abbey of Cluny for forty years, until 994. The chronicle says that an angel brought him the book of monastic rule; having become the friend and confidant of Otho the Great, the tiara was offered him by his son Otho II, whom he reconciled to his mother, S. Adelaide; he refused, he said, "because the Romans and he differed as much in manners as in

The imprecations contained in this deed of gift against these, who dared to lay hands on the property of the monks of Cluny, or to change their privileges, show what precautions givers then believed should surround their legacies. [1] The old duke William did not stop there, but he made the journey to Rome to have his donation ratified, and to pay to the Church of the Apostles the promised royalty of Gernon, according to the rule of S. Benedict, installed at Cluny twelve monks from its monasteries, and erected buildings to contain the new community. But S. Odon, second abbot of Cluny, alone merits the title of chief and of creator of the House. Odon descended from a noble Frankish family; he was a profoundly learned man, who soon acquired considerable influence; he made three journeys to Rome, reformed in that capital the monastery of S. Paul-w-t-W; he likewise subjected to the rule of Cluny the monasteries of S. Augustine of Pavia, of Tulle in Limousin, of Aurillac in Auvergne, of Bourg-Dieu and of Massay in Berry, of S. Benoit-sur-Loire, of S. Pierre-le-Vif at Sens, of S. Julien of Tours, of Sarlat in Perigord, of S. Allire of Clermont, of Romain-Moutier in Vaud; he was chosen as arbiter of the dispute between Hugues, king of Italy, and Alberic, patrician of Rome. Odon was the first to realize the idea of adding to his abbey, and under the authority of the abbot, new communities originated by him and others, whose practices had been reformed by him. "No separate abbots but only priors for all these monasteries, the abbot of Cluny alone governs them; unity of rule, of statutes, regulations and discipline. It was an aggregation of monasteries around a single one, that became its capital and head. This system was soon understood and adopted by other monastic establishments, notably by Citeaux founded in 1098. Retaining the rule of S. Benedict, these communities only differed by the centre of monastic authority, by the various means suggested for maintaining the Benedictine spirit, and by a greater or lesser austerity in the common discipline. Actually no one proposed for himself any purpose different from that of his companions. There were properly no differences of rules, but only of communities. Everywhere the rule of S. Benedict remained safe, and was maintained intact, in spite of rivalries that broke out later." [1]

Note 1. p. 249. See bottm text.

by the canonical and apostolical authority thou hast received from God, thieves, transgressers, sellers of what I give you, with my full satisfaction and my evident will. Be the guardians and protectors of Cluny, and of the servants of God, that shall live and sojourn there, as well as of all their domains destined for almsgiving, the clemency and mercy of our very p pious Redeemer. That if any one, my relative or a stranger, of whatever condition or power he may be (which will be prevented, I hope, by the mercy of God and the patronage of the apostles), that if any one, by whatever manner and by whatever craft it may be, shall attempt to violate this testament, that I have desired to sanction by the love of Almighty God, and by the respect due to the princes of the apostles, Peter and Paul, let him first incur the wrath of Almighty God; let God renounce him from the land of the living, and efface his name from the book of life; let him be with those, who said to God, retire from us; let him be with Dathan and Abiram, b eneath whose feet the earth opened, and the hell swallowed up alive. Let him become the companion of Judas, who betrayed the Lord, and be buried like him in eternal torments. Let him not in the present age show himself with impunity to human e eyes, and let him suffer in his own body the torments of future damnation, a prey to the twofold punishment of Heliodorus and of Antiochus, from which one scarcely escaped half dead from repeated strokes of the most terrible scourging, and the other expired miserably, struck by a hand from on high, the members fallen into decay and eaten by innumerable worms. Finally, let him be with all other sacrilegous, that have dared to pollute the treasure of the hand of God; and if he does n not return to repentance, let the great key-bearers of the e entire monarchy of the Church, and S. paul in addition, shut to him forever the entrance to the happy paradise, instead of being for him, if he had desired, very pious intercessors. B Besides, let him be seized by earthly law, and be condemned by the judicial power to pay a hundred pounds of gold to the monks, that he desired to attack, and let his criminal undertaking produce no effect. And let this testament be clothed with all authority, and remain always inviolable in all its stipulations. Done publicly in the city of Bourges."

Note 1. p. 248. See Latin text.

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Note 1. p. 248. See Latin text.

persons that I have named. We ordain that our donation shall particularly serve to furnish a refuge for those, who are left poor by the age, and will bring these only good will; and we will that our superfluities may thus become their abundance. Let the monks and all things here named je under the power a and control of abbot Bernon, who will govern them regularly, while he shall live, according to his knowledge and powers. But after his death, let the monks have the right and the power to freely elect their abbot and master a man of their own order, according to the good pleasure of God and the rule of S. Benedict, without our power or any other being able to reverse or prevent that religious election. [1] Let all the monks pay during five years to Rome the royalty of ten sous of gold for the lights of the church of the apostles, and that placing themselves under the protection of the said apostles, and having for protector the pontiff of Rome, [2] they build themselves a monastery at Cluny, to the extent of their power and k knowledge, in the fullness of their hearts. We will also that, in our time and in the time of our successors, as much at least as permitted by the opportunity of the time and the location of the place, for works and intentions of mercy, to the poor, the needy strangers and filgrims."

Note 1. p. 247. See Latin text.

Note 2. p. 247. See Latin text.

"It has pleased us to insert in this testament, that from t this day, the monks gathered at Cluny in assembly shall be entirely freed from our powerand that of our relatives, and shall be subject to neither the bonds of the royal grandeur, nor to the yoxe of any earthly power. [1] by god, in God and al his saints, and under the fearful cenale of the last judgment, I pary and supplicate, that neither secular prince, court or bishop, nor the pontiff himself of the Roman church, encroach on the possessions of the servants of God, neither sell, diminish, nor give under title of benefice, to whoever it may be, anything belonging to them, or permit the establishment of a chief over them against their will! And that this protection may more strongly bind the wicked and the rash, I insist and add, and implore you, O holy apostles Peter and Paul, and thou pontiff of pontiffs of the apostolic throne, to expel from t the communion of the holy Church of God and from eternal life,

in that faith and that hope, that if I cannot myself succeed in despising the things of the earth, yet I shall receive the reward of the just, when the monks, scorning the world, and that I believe just in the eyes of God, will have received my liberality. That is why to all those living in the faith and imploring the mercy of Christ, to all those succeeding them and who will live until the end of the centuries, I make known, that for the love of God and of our Saviour Jesus Christ, I give and deliver to the apostles Peter and Paul all that I p possess at Cluny, situated on the river of Grone, with the chapel dedicated to S. Mary, mother of God, and to S. Peter, prince of the apostles, without exception, all the things that depend on my domain of Cluny (villa), farm, oratories, slaves of both sexes, vineyards, fields, meadows, forests, waters, streams, mills, right of passage, lands uncultivated or cultivated, without reserve. All these things are situated in the county of Macon or the vicinity and contained within their b boundaries, and I give to the said apostles, I, Willian and my wife Ingelberge, first for the love of God, then for love of king Eudes, my lord, of my father and my mother; for me a and my wife, i.e., for the salvation of our souls and our bodies; for the soul also of Albane, my sister, who left me all her possessions in her will; for the souls of our brothers a and our sisters, of our nephews and of all our relations of both sexes; for the faithful men attached to our service; for the maintenance and integrity of the catholic religion. Finally, and as we are all united to all Christians by the bonds of the same faith and the same charity, that this donation is again made for all the orthodox of past, present and future times. But I give under the condition that a regular monastery shall be erected at Cluny in honor of the apostles Peter and Paul, and that there shall be gathered monks, living according to the rules of S. Benedict, possessing, holding and controlling in perpetuity the things given; so that this may become the venerated dwelling of prayer, that it may always be full of faithful vows and pious supplications, and that m may be desired and sought there forever with strong desire a and intimate ardor, the wonders of an intercourse with heaven. That continual supplications and prayers may be addressed to the Lord without interruption, both for me and for all the p

realizing his project. "They finally reached," says the chronicle, "a place distant from all human society, so deserted t that it seemed in a way the image of celestial solitude? This was Cluny. But as the duke objected, that it was hardly possible to establish himself in such a place, because of hunters and dogs, [redacted] filled and disturbed the forests covering the place, [redacted] responded smilingly; "Drive away the dogs and bring the monks; for do you not know what better profit will remain to you from hunting dogs or the prayers of the monks." This reply decided William, and the abbey was established. [1] That was about 909. We believe that the will should be copied here, the deed of gift of duke William; this document is a w work, remarkable as much for the elevation and simplicity of language, as by the interesting details it contains, and the spirit that dictated it; [1] it further exhibits the moral and material importance then given to religious establishments, the influences from which it was desired to remove them, and the grand civilizing mission entrusted to them; finally it reveals an entire epoch.

Note 1. p. 245. Histoire de l'abbaye de Cluny, by P. Lorain. p. 16. Paris. 1845.

Note 1. p. 246. From the excellent work of P. Lorain we take this translation. (Bibl. Clun. Vols., 1, 2, 3, 4.

"All the world may understand," says the testator, "that God has only given numerous goods to the rich, so that they may merit eternal rewards by making good use of their temporal p possessions. The divine word states this, and manifestly counsels when it says; the riches of man are the redemption of his soul.(Proverbs). What I, William, count and duke, and Ingelsborg, my wife, maturely think and desire, when there is still time to provide my own salvation, I have found good and even necessary to dispose of for the benefit of my soul, some of the things that have come to me in time. For I do not wish in my last hour to merit the reproach of having only thought of my earthly wealth and of the care of my body, and to have reserved no consolation for the supreme moment, that must take from me all things. I cannot in that respect do better than to obey the rule of the Lord; I will make myself friends among the poor, and by perpetually prolonging my benefits in the g gathering of monastic persons, that I shall support at my cost;

locksmiths, fullers; g is the fruiterer; r are lodgings of p pilgrims, the poor, their kitchen and refectory.

Note 1. p. 243. The original plan of the abbey of S. Gall (in Switzerland)is preserved in the archives of that monastery; it is reproduced at small scale by Dom Mobillon (Ann. Bened. Vol. 2. p. 571), and was recently published in facsimile by M. F. Keller with a descriptive notice. (Instructions sur l' Arch. monast. by Albert Lenoir).

Note 2. p. 243. Here is the passage of this letter given by Mobillon. (Ann. Bened. Vol. 2. p. 571, 572). See Latin text.

Under Charlemagne the religious establishments had acquired wealth and an importance already considerable; they were at the head of education, agriculture, industry, arts and sciences; alone they presented regular and stable establishments. From them came all men called to play a part outside the career of arms. From its foundation until the council of Constance in 1005, the order of S. Benedict had founded seventy abbeys in the world then known, had given to the Church 24 popes, 200 cardinals, 400 archbishops and 7000 bishops. But that prodigious influence had been the cause of numerous abuses, even within the regular clergy; the rule of S. Benedict was greatly relaxed after the 10 th century, the periodic invasions of the Normans had destroyed monasteries and dispersed the monks; the misery and disorder resulting changed the character of t that institution; the feudal subdivision completed the destruction, that the abuse of wealth and power, as well as the m misfortunes of the time had begun. The monastic institutions could revive and resume the important part, that it was called to perform during the 11 th and 12 th centuries only after a reform. Modern civilization was scarcely born in the reign of Charlemagne and seemed expiring in the 10 th century; but the order of S. Benedict, reformed by the abbots of Cluny and by the rule of Citeaux, must put forth vigorous shoots. In the 10 th century Cluny was a little village of Maconnais, that by a legacy became the property of the duke of Aquitaine, William the Pious. Toward the end of his life duke William wished to found a monastery, according to the custom of a great number of powerful nobles. He called Bernon of a noble family of Sequanie, abbot of Gigny and of Baume, and desired in the company of that holy personage to seek a place suitable for real-

impluvium and halls around them; privies communicate with the building by a passage; at the west of this structure are cellars, a bakery and a kitchen for quests; L is the sacristy at the right of the eastern choir; M is a hall for scribes at t the left of the choir with library above; N N are two winding stairs ascending into two circular halls in which are placed altars dedicated to the archangels S. Michael and S. Gabriel; O is the church entrance reserved for the people, with narthex; around the sanctuary is a double side aisle for believers; P is the vestibule of the monastery servants; R the vestibule of the guests and the pupils. Along the northern side aisle are arranged various halls intended for masters of the schools, for those demanding asylum, and dormitories' S is the refectory with wardrobe over; T is the cellar with hall over for p preserving provisions; U the baths; V the dormitory with heated [redacted], beneath; the chimney flue is detached; X are detached privies connected to the dormitory by a narrow bent passage; Y is the kitchen with narrow bent passage connecting it with the refectory; these passages are evidently arranged so as to prevent odors from passing into either the refectory or the dormitory; Z is the room for making the consecrated bread; b is the kitchen garden, each bed indicated by the name of the vegetables to be cultivated there; b' is the house of the gardener; d is the orchard with indication of the fruit trees a and their names; e is a building reserved for novices at one side, and for the infirm at the other, with double chapel, each of these buildings containing a cloister with porticos around it, heaters and detached privies; f is the poultry houses and the lodging of the chief of the lower court; g is the lodging of the physician; h is a little garden for cultivating medicinal plants; h' is the pharmacy; i is the lodging of the abbot; j is the kitchen of the abbot, a cellar, baths and chambers of his servants; l is the lodging of guests, with stable, rooms for servants, refectory at the centre, water and detached privies; m are lodgings with stables and sheds for grooms, s shepherds, swineherds, servants, retainers, etc.; n is the h habitation of the coopers, rope-makers, cowherds, with stables; storehouses of grain and a dryer for heating grain; o are buildings intended for making beer, lodgings of serfs, a hand mill and mortars; p are lodgings and shops of shoemakers, harness makers, armorers, makers of shields, turners, goldsmiths,

and mills, around which the country people grouped themselves, finding in these centres a moral protection more efficient, than that accorded by carfty and avaricious conquerors. These new apostles thought not alone of the material needs for ensuring the existence of themselves and their numerous colonists, but they cultivated and taught letters, sciences and arts; t they strengthened souls, gave them an example of abnegation, taught them to love and protect the weak, aid the poor, expiate faults, practise Christian virtues, respect their fellow men; they cast themselves into the midst of debased peoples, with the first germs of liberty and independence, who gave t them the example of moral resistance to brutal force, and opened to them an inviolabbe and sacred asylum of prayer, as t the last refuge ffom the evils of soul and body. Thus we see from the 9 th century the monastic establishments had already attained a great development; not only do they comprise edifices for worship, lodgings for religious persons, buildings intended for provisions, but also considerable accessories, infirmaries for the aged, schools, cloisters for novices and strangers; separate places for various services, gardens, etc. The plan of the abbey of S. Gall, made about 820 and still p possessed by the archives of that suppressed monastery, is a project sent by a designer to abbot Gozbert. Mabillon thinks that this drawing is due to abbot Eginhard, who directed the court buildings under Charlemagne; whoever was its author, it is of great interest, for it gives the programme of an abbey of that epoch, and the letter to abbot Gozbert accompanying the plan permits no doubt of the authority of the person who wrote it. [1] We present here (1) a reduction of this drawing. [2] The church occupies a large space in that plan, it has two o opposite apses like many Rhenish churches (Art. Architecture Religieuse); A is the choir at the east, the confessio beneath the sanctuary; B D the exedra, the place of the abbot and dignitaries; C the altar of S. Mary and S. Gall, with a sort of gallery around it entitled on the plan "gallery around"; behind the altar dedicated to S. Gall is his sarcophagus. F are stalls for the religious, the two ambos for reading the epistle and gospel; F are various altars; G baptismal fonts; H is a second choir at the west; I a second exedra for the religious: K is the school with its courts arranged like the Roman

view of prophets reading the future, found only scornful expressions for our old religious architecture, and understood neither its sense nor spirit.

ARCHITECTURE MONASTIQUE. Monastic Architecture.

During the first centuries of Christianity, some Christians fled from the excesses and misfortunes to which the new society was exposed, and established themselves in the deserts. In the East was first seen the monastic life developed and follow the rule written by S. Basil after the 4 th century; in the West the solitudes were peopled by religious persons gathered by the rules of S. colomban and S. Ferreol. But then these f first religious persons retired into caves, ruins or isolated huts, devoted to a life of meditation, cultivating some bits of ground for their support, not yet forming those great associations later known under the name of monasteries; they assembled only in an oratory built of wood or of dry stones to pray together. Fleeing the world, professing the greatest poverty, these men brought into their solitudes neither art nor anything to tempt the avarice of barbarians or of the native people. In the 6 th century S. Benedict gave his rule; from Mt. Cassino it soon extended into the entire West with prodigious rapidity, and became the only one practised for several centuries. That an institution may have that strength and duration, it must respond to a general need. In that and regarded only from the philosophical point of view, the rule of S. Benedict is perhaps the greatest historical fact of the middle ages. We live under regular governments and in the midst of a civilized society, can represent to ourselves with difficulty the frightful disorder of the time, that followed the fall of the Roman empire in the West; everywhere were ruins, incessant broils, the triumph of brutal force, forgetting every sentiment of right and justice, contempt for human dignity; fallow ground swept by famished bands, devastated cities, entire peoples driven away, massacres, pestilence, famine and through this chaos of society in agony invasions of barbarians returned periodically into Gaul, like the waves of the sea on the sandy shores. The monks descended from Mt. Cassino spreading in Gaul, carrying with them a multitude of laborers, cleared forests, established water courses, erected monasteries

17 th century, since they know how to retain in their religious edifices a certain grandeur, a sobriety of lines and an instinct for proportions, that are found nowhere else in Europe in that epoch. While in Italy architects yield to the strangest extravagancies, to the most monstrous orgies in taste, there were erected in France churches, that are comparatively masterpieces of style, although then men prided themselves on finding perfection only in the monuments of antique or modern Rome. This preference for foreign arts and artists, and especially for Italian, came to us with the Renaissance, with the patronage given by the sovereigns to everything coming from beyond the mountains. The monarchy, that from the 13 th to t the 16 th centuries had increased in the midst of that populA. tion of French artists and artizans, whose work and genius h had no little contributed to increase its glory and power, f forgot its entirely national origin and henceforth tried to impose its tasks on the nation. From the day in which the court desired to direct the arts, it suffocated the national g genius in the old Gallo-Roman peoples. Patronage must be discreet to not frighten the arts, that particularly need freedom to produce original works. After Louis XIV, architects that seem to present more aptitude, sent to Rome under academic d direction, thus on leaving the Ecole being cast into a city of whose innumerable marvels they had read, gradually lost that freedom of proceedure, native originality, that experimental method, which distinguished the ancient masters of works; their portfolios filled with models collected without order of criticism, these architects returned strangers in the midst of workmen, that formerly were like a part of themselves, like their limbs. The royalty of Louis XIV isolated the feudal nobility at the court to weaken an influence against which their predecessors had sustained so many struggles, it equally isolated the guilds of workmen in the great cities, desiring to hold them subject,tand to subject to its tastes the head of the arts' it believed in thus attaining that political and in intellectual unity, the constant aim of the monarchy and the people after the 12 th century, and did not see that it placed its nobles anf its artists outside the country. That oblivion of a part so full of instruction was indeed then complete, s since Bossuet himself, who wrote history with the grandeur of

cathedrals, admitting that these could not all have been erected before those disastrous epochs. Religious edifices entirely built during the 14 th century are rare, and even rarer during the succeeding century. men were then contented to complete unfinished cathedrals, or to modify the primitive arrangements of the 12 th and 13 th centuries, to restore and to enlarge them. At the end of the 15 th century and the beginning of the 16 th, when France commenced to recover its power, when a new impulse is given to religious architecture, but Gothic tradition continues, although corrupted and debased. Many great cathedrals were completed, and a great number of small churches ravaged during the wars or fallen into decay because of long abandonment and the public misery, were rebuilt and repaired. But the reformation soon came to arrest this movement, and war, fire and pillage destroyed or mutilated a again most of the scarcely restored religious edifices. Then the evil was without remedy, when at the end of the 16 th century peace was reestablished; the Renaissance had effaced the last vestiges of the old national art, and if for a long time still the arrangements of the French churches of the 13 th c century were followed, the genius presiding over their construction was extinct and scorned. It was desired to apply the forms of antique Roman architecture, that were badly known, to the system of construction of pointed churches, that were despised without understanding them. Under that undecided inspiration was commenced and finished the great church of S. Eustache of Paris, a monument badly conceived and badly constructed, a confused mass of rubbish gathered from all sides, without connection or harmony; a sort of Gothic skeleton covered by Roman rags sewed together like the pieces of the dress of a clown. Such was the vital force of religious architecture originated with the dominance of the royal power in France, that its general arrangements continued until during the last century; the plans remained Gothic and the high vaults continued to be abutted by flying buttresses. But this bastard architecture was struck with sterility. Architects appear far more occupied in placing Roman orders in their monuments, than in perfecting the system of construction, or in seeking new combinations; the execution becomes heavy, coarse and affected at the same time. Yet we must do justice to the architects of the

architecture resolutely pursued the results of its principle. [1] In examining this plan it is easy to see to what point the a architects of the 13 th century sought to relieve the interiors of their edifices from the obstacles that might obstruct the view, and how desirous they were of obtaining large spaces, consequently diminishing the number and dimensions of the supports. (Art. Cathedrale). Later in the 14 th century was erected the abbey church of S. Ouen, that summarizes the most simple principles of religious architecture. Nave without chapels; transepts with side aisle; choir with side aisle and radiating chapels, that of the largest chevet; tower over the crossing and two bell towers on the facade. (62). [2]

Note 1. p. 237. We give the plan of this choir with the chapel of the Virgin built in the 14 th century on the site of a chapel of the chevet like the two others still existing, but a little larger.

Note 1. p. 239. The plan here given is that of the choir of Beauvais as executed in the 13 th century before the restorations of the 14 th and 1. th centuries.

Note 2. p. 239. The bell towers indicated on this plan were only commenced in the 16 th century; they were finished, but they present a special arrangement not without grandeur, affording a wide porch, and on the whole a fine arrangement of the plan. Their stumps were demolished to give place to a facade in the style of the 14 th century.

From the 14 th century the architecture of religious edifices becomes nearly uniform in the entire territory subject to the royal power; plans so to speak are classed according to the dimensions of the edifices, and without notable differences, and they follow the arrangements and mode of construction adopted at the end of the 13 th century; it is only in the d details, the ornamentation, the profiles of the mouldings, t that the transformation is felt. We then refer our readers to the different parts of religious edifices treated in this Dictionary in order to appreciate the nature of this transformation, to know the causes and results. The 13 th century had produced so much in religious architecture, that it left little for the succeeding centuries. The wars that troubled France during the 14 th and 15 th centuries no longer permitted undertaking edifices of an importance equal to our great cath-

areas on the plan of less importance than those of the parallel bays. That was further very well reasoned. These piers b being closer and receiving but a single rib of the great vault did not need to be as large as those of the parallel bays, m more widely spaced and receiving two diagonal arches from the great vaults. The choir of the cathedral of Mans, contemporary with that of Chartres, presents a far more beautiful arrangement (59); the vaults of the double side aisles recall the construction of those of Bourges, but are more skilfully combined; here the chapels are large and deep, yet leaving between them free spaces for opening windows for lighting the double side aisles. As at Bourges, these two side aisles are unequal in height; the second being lower anf surmounted by a triforium and by windows lighting the first side aisle.

Dating from 1220 to 1230, it is rare to see the sanctuaries of cathedrals surrounded by double side aisles; men are satisfied with a single side aisle, and the radiating chapels take more importance. In the primitive pointed churches, as for e example the cathedral of Rouen, whose sanctuary has but a single side aisle, the chapels are only in limited number, so as to allow between them direct light for the side aisle. (60).[1] We here see vaults combined according to a method little used at that epoch. Between the chapels and in the side aisles the great triangle A B C is divided by an arch joining the crown of the diagonal arches; that was a means less simple than that employed at Notre Dame of Paris for constructing a vault resting on five supports, but which was more conformed to the principle of the Gothic vault. In the side aisle of the cathedral of Auxerre, the same system of vaulting was adopted with still greater skill. (Art. Voute). About the middle of the 13 th century, in churches with a side aisle extending around t the sanctuary and with radiating chapels, windows between these chapels were rejected. These were nearer and left between them only the buttresses receiving the flying buttresses. These chapels, like all apses, definitely adopted the polygonal plan as more stable and easily constructed. The chapels on c circular plans were a remnant of Romanesque tradition, that must disappear like all others. Here (61) the plan of the choir of the cathedral of Beauvais (1240 to 1250), which shows how the arrangement of the plan was simplified as pointed ar-

arches N P, M P, G R, P R, P S, I S, thus passing without difficulty from the equal to the unequal number; as for the triangular compartments, they proceeded by that construction of arches. (Art. Voute). Thus they proceeded from the archivolt of the inside bay to the two transverse arches of the second side aisle and to the three side arches of the external wall; beneath these side aisles could be opened three windows equal in height and width to those of the parallel bays. The external and internal arrangement of the edifice follows without interruption and without breaking the unity in the radiating part of the choir.

In is unnecessary to emphasize the skill in this system, a and how much tne art of architecture had already developed in Ile de France from the end of the 12 th century, how much the unity of arrangement and style occupied the artists of that province. Indeed never in great or little religious monuments of Ile de France does one meet with those discords, those joinings more or less skilfully concealed, that in even the edifices of the adjacent provinces denote the effort of persons lacking the creative genius, that conceives its work all of a piece, and executes it without hesitation.

This beautiful system, that consists in giving to the bays of the apse a width equal to the parallel bays of the nave, was unfortunately not followed in the other cathedrals of the royal domain. At Bourges (1230), the choir of the cathedral recalls the beautiful arrangement of that of Paris.(57). But if the vaults are very skilfully combined in the second side aisle, tne piers of this aisle not being doubled as at Notre Dame of Paris, the inner piers must be closer, and by their n number and the narrowness of the intercolumniations, they conceal the side aisles and the chapels. At Chartres (1220), the choir of the cathedral (58) presents a plan not conferring g great honor on its architect; there is a discord between the apse and the lateral parts of the sanctuary; the spacing of the columns of the second side aisle is loose, and the vaults are poorly combined; in spite of the great width of the intercolumniations of the second side aisle, it was necessary to space the inner piers closer; but here appears a tendency from which the architects of the 13 th century never departed from about 1220; indeed we see the inner piers of the apse take in

could not solve, i.e., to harmonize the construction of the vaults of the apse with those of the parallel bays, thus is found very neatly and skilfully solved thirty or forty years later in the choir of the abbey church of Vezelay, and by procedures not entirely those employed by the architects of the royal domain, but subjected to Roman traditions. In arrangement of the plan was always presented a difficulty in the construction of the choirs of the great cathedral churches, which was the radiation of the bays that spaced excessively the points of support on the external circumference, if the points on the internal circumference retained the same spacing as t those of the parallel parts; or that brought these internal supports too close to each other if those in the external circumference were at proper distances; when the choirs had two side aisles as at Notre Dame of Paris and Bourges, the inconvenience was again even more apparent. From 1170, i.e., a little time after the construction of the choir of the cathedral of Langres, the architect of Notre Dame of Paris knew how to erect a choir with double side aisles, which already solved t these difficulties by freeing himself from Romanesque traditions. Not desiring to give to the internal bays of the apse an intercolumniation A less than that of the parallel bays B (56), C D being the diameter of the circle, it followed that the f first radiating bay gave a first area L M H G difficult, and a second area H G F F impossible to vault. How could be constructed a side arch from F to F? If round its curve would be raised to a level very much higher than the crown of the equilateral pointed archivolt L M. The second radiating bay opening still more would increase the difficulty. The constructor then erected intermediate piers O P between the columns of the second side aisle, also an intermediate pier Q at the outer wall of the second bay, and two intermediate piers R S at the wall of the succeeding bays. This arrangement gave 2, 3 piers in the first bay, 2, 3, 4 piers in the others, made impossible the construction of cross vaults only composed of the diagonals of a square or of a parallelogram, consequently only being able to spring only from corresponding piers in equal number. This constructor was not stopped by that difficulty; he abandoned the system of intersecting cross vaults, and his transverse arches M G F, N T K being established, he turned other

$222,000). [1] The vaults of the choir of Vezelay were originally erected without flying buttresses. But it appears that a little after their completion it was necessary to rebuild them. The triforium opened into the roof of the side aisle as at t the cathedral of Langres, and that roof was soon replaced by half cross vaults abutting the springings of the great vaults. Here (54) are the two first bays of that choir (longitudinal section) and (55) is the plan of these two first bays. Note the special arrangement of the piers and the division of the bays. The first bay opens widely; it is an archivolt springing from the great pier of the transept, that is composed of a g group of engaged columns, its right impost resting on a monolithic column. Above the triforium that bay is bisected by an intermediate pier supporting a transverse arch. The vault is composed of two groin arches resting on two principal supports A and B. (Fig. 55). But the second bay is bisected by twin c columns C; the first division is covered by a cross vault, t the second throws against the crown E an arch C E, that powerfully abuts the thrust of the radiating arches of the apse. According to that arrangement the upper windows can all be of the same dimensions in width and height, and the thrust of t the radiating arches at the crown of the transverse arch G E is properly resisted by C E, and the divided bay B C G serves as a transition between the radiating bays I G and the first great bay A B, so as to avoid the thrust exerted by the little radiating archivolts I G on the larger archivolt G B, if that archivolt had not been divided. This danger of the thrust was no longer to be feared on the pier B, because of the great load transferred to that pier, and one could without i inconvenience leave the archivolt A B open for its entire width.

Note 1. p. 229. Langres is in Champagne territory; but in style of architecture it belongs to Burgundy.

Note 1. p. 230. Langres was a Roman city; there may still be seen an antique gate decorated by fluted pilasters.

Note 1. p. 232. Gallia Christiana. -' The silver livre was divided into 20 sous, and the sou into 12 deniers. 12 livres of bread at that time cost about 1 denier. The silver livre then represented about 500 francs, and 2220 livres were about 1,110,000 francs or $220,000.

The problem that the architects of the cathedral of Langres

structures joining each other and badly connecting. Great vaults make this discord more evident, for the first bay is covered by a cross vault and the apse by a half dome generated by the last pointed transverse arch; and a remarkable fact is that this half dome is maintained by flying buttresses, that date from its erection. At the springing of the half dome open small round arched windows, whose archivolts penetrate it, w while under the side arches of the first bay the windows can be high and be opened in the eave walls. The system of pointed construction frankly adopted already in the rest of the e edifice is entirely foreign to the apse, that remains Romanesque, at least in its upper portion. Such a shocking defect in harmony cannot fail to cause constructors to make new efforts to apply to the apses, as to the entire remainder of the edifices, the method of vaulting with pointed arches. As for ornamentation, the cathedral of Langres remains equally Romanesque,, the triforium opens into the roof covering the side aisle; the piers are composed of fluted pilasters, as at Autun, Beaune, Cluny, Charite-sur-Loire, conformably to antique tradition; the buttresses of the choir have attached great fluted pilasters, terminated by corinthian capitals, the capitals of the columns of the choir being imitations of Composite capitals. [1] the front portion of the nave itself was erected from 1180 to 1190, and shows capitals with crockets, although the piers remain composed of fluted pilasters as in the choir and transept. On a portion of Burgundian territory, Romanesque t tradition then continued quite late in episcopal churches, a and the pointed vault and flying buttress were adopted only from necessity, and as a means recently applied for vaulting edifices without thrust on the walls. It was only from 1200 to 1210, that pointed architecture was frankly introduced into Burgundy, when it had already prevailed for twenty or thirty years in the royal domain and in Champagne. One of the first and most beautiful examples of the pointed Burgundian architecture is found in the choir and transept of the abbey of Vezelay, and that abbey politically belongs rather to Nivernais than to Burgundy. (Art. Abside, Fig. 3, plan of apse). This choir must have been built by abbot Hugues from 1198 to 1206; for in that last year abbot Hugues was deposed for having indebted the monastery in 2220 livres of silver (1,110,000 frs.=

shortly after the construction of that edifice was erected at Langres the cathedral still existing today.[1] This is the cathedral of Autun but with cross vaults on pointed arches over nave and transepts, side arches extending around the choir a and a single chevet chapel. Here (52) is the plan of the cathedral of Autun and (53) is that of the cathedral of Langres. The porch of the cathedral of Autun is little later than the construction of the nave; the facade of the cathedral of Langres having been rebuilt in the last century, we do not know whether it was preceded by a porch. The choir of the cathedral of Langres with its side aisle extending around it is very interesting to study, for until then in that part of France, the apses were almost always simple, without side aisles and vaulted by a half dome. Langres, whose sanctuary dates from about 1160, gives the transition between the choirs erected according to Romanesque requirements and those built at the end of the 12 th and beginning of the 13 th centuries. We see at Langres as at Autun, the choir commences by a bay entirely similar to those of the nave. At Autun this first bay is repeated by a second and then comes the simple principal apse without side aisles and flanked by two little apses like the c churches on the Rhine. At Langres after the first bay of the choir is a series of columns set in a semicircle supporting the ribbed cross vaults of the side aisle. These vaults are simply traced, for each radiating bay of the side aisle forms a wedge, and the pointed arches give straight lines in horizontal projection, so that it follows that the intersection of the diagonals are much nearer the sanctuary than the external wall; the springings of the archivolts turned between the columns are at the same level as the springings of the side aisles on the wall of the aisle, and the side arches as well as the archivolts being pointed, the crowns of the side arches are much higher than those of the archivolts, consequently t the lines of the crowns of the vaults are strongly inclined. (Art. Voute). The archivolts of the first bay of the choir g give the height of the triforium opened in the wall abutting the roof, and there remains a wider space between the base of this triforium and the archivolts turned between the columns. There is then a complete change of system between the parts parallel to the choir and to the apse, i.e., two different

permeated by Roman traditions, in which the Cluniac and Cistercian churches had left unchangeable traces. This province is one of those most favored with materials of excellent quality. The upper basins of the Seine, Yonne and Saone abundantly supply limestones, hard and soft sandstones, easy to quarry in large blocks, with beautiful grain, unequaled strength and d durability. Thus the Burgundian churches are generally built of large materials, are well preserved and with skilful jointing. This abundance and the superior qualities of the stone influence the forms of Burgundian architecture, particularly at the epoch when the use of materials plays a great part in the appearance of religious edifices. In the 13 th century, constructors in that province profited by the facility offered for obtaining great and very strong blocks, set on edge w without danger, to avoid multiplying courses in the principal supports. They did not fear to erect monolithic piers and were the first to place on the cornices at the edges of roofs broad gutters forming flat ceilings between the side arches of the vaults and the walls. (Art. Arc Formeret, Fig. 45). Possessing easily cut but very strong, they gave their mouldings a strong projection and accented them energetically, grandeur to their sculptured ornament, an appearance of abundance, that distinguishes their decoration in stone from that of the adjacent provinces. Burgundian architects only adopted late the complex tracery, perforated balustrades, the slenderness that already in the second half of the 13 th century belongs to the architectural forms of Champagne and Ile de France.

At Paris, Rheims and Troyes, pointed architecture already tended to its decadence, when in Auxois, Dijonnais and Maconnais were yet retained simple forms, firmness in profiles, b breadth in ornamentation, the native originality of the province. Only in the 15 th century did Burgundian architecture become dry and monotonous; then the charcater peculiar to each province was effaced, and there was no longer but a single a architecture in the in the territory composing the France of today; or at least the differences to be noted in each province refer rather to a rude or imperfect imitation of an architecture only adopted under local influences or traditions.

We have given (20) the cross section of the cathedral of A Autun built about 1150, whose nave has a pointed tunnel vault;

comparison with our great northern cathedrals. The cathedral of Alby produced some imitations, the abbey churches of Moissac, of S. Bertrand Comminges among others; this type did not pass outside the territory where it developed, but it was continued until the epoch of the Renaissance. The south of France was exhausted by religious wars during the 12 th can 13 th c centuries, and could only produce poor edifices; in adopting the church with a single nave without side aisles as the type of its religious monuments, it obeyed necessity, these structures being much less expressive than our northern churches with their transepts, side aisles, chapels radiating around the choir, upper galleries, flying buttresses and great windows with tracery adorned by splendid glass. The memory of the civil wars give these religious edifices the appearance of m military structures, and many of them were actually fortified. The abbey church of Moissac was fortified at the time of the wars with the Albigenses; the cathedrals of Alby, Beziers, N Narbonne, and nearly all the parish or monastic churches erected during the 13 th and 14 th centuries were defended like actual fortresses, consequently adopted simple forms, had only narrow and scarce windows on the exterior, were crowned by towers with buttresses, machicolations, were surrounded by w walls, were built on sites protected by nature, opened only by lateral doorways, often concealed and difficult of access, p protected by defenses. (Arts. Cathedrale, Eglise). After the civil wars occurred the wars with Arragon; all the cities of Languedoc forming a part of the royal domain under S. Louis, Philip the Fair and Charles V on the frontiers of Rousillon and of the county of Foix were constantly exposed to the invasions of their powerful neighbors. Each edifice had been utilized in these cities for defense, and naturally the churches as the highest and most important became forts, partaking as much of military as of religious architecture. Guienne, possession of which was constantly contested during the 13 th and 14 th centuries by the kings of France and of England, retained its old Romanesque churches, but built only rare and poor religious edifices, pale reflections of those of the North. As for Burgundy, rich, populous and united, it developed its religious architecture under the inspiration of that of the royal domain, but mingling with it its own genius strongly p

buttresses. In the enclosing wall that closes and surmounts these chapels are opened tall windows, that light the interior.(49). The sanctuary of these churches is composed either of a single apse, like the church of Montpezat, and of the 13 th century (50), or of three apses, one large and two small as at Carcassonne. Most of these churches were preceded by a porch surmounted by a single bell tower placed in the axis of the church. During the 14 th century the great church of Alby was built on that system; only that two stories of chapels w were arranged so as to entirely enclose the buttresses in the interior (51), and the vaults with pointed arches in the chapels of the second story are turned on the side arches of the vault of the nave and attaining its level. Long and narrow w windows were placed in the enclosing walls of the high chapels. Instead of three apses opened in the eastern wall as in the two churches of Carcassonne, the choir of Alby is terminated by 7 radiating chapels in two stories like those of the nave. (Art. Cathedrale). This arrangement is imposing; the nave of S. Cecile of Alby has not less than 58 ft. in clear width, b but it is necessary to state that for Catholic worship, great churches without side aisles are inconvenient. Nothing in this great nave indicates the place of the believers or that of the clergy; at Alby it was necessary in the 15 th century to establish a choir enclosed by an elegant stone screen, that forms a side aisle around the sanctuary; the chapels are small. This monument without side aisles or transepts, in which the sanctuary seems like furniture placed later, is rather a hall than a cathedral devoted to the needs of worship. The chapels io the second story communicate with eact other by small doorways and have no utility, but are places that injure the lighting and consequently darken the interior. This monument was built of bricks and was covered internally by paintings dating from the end of the 15 th and beginning of the 16 th centuries, w which decoration produces a great effect and disguises the h heaviness of these vaults, that because of the extreme width of the nave, spring at about half the total height in the clear; the buttresses are inclosed in the interior and by their projection conceal the windows and make the piers supporting the vaults appear flat and lean. Without its paintings this interior would be cold, gloomy and heavy, and would not bear

are actual exceptions, exotic monuments, not connected with the indigenous structures of those countries.

The South of France had been left to the Albigenses during the 12 th century and a part of the 13 th; its religious architecture had remained stationary then while in the North it had made rapid progress. Most chaurches had been destroyed d during the civil wars, the result of the combats of the heretics with Catholics, and it is difficult today to know what was the course pursued by that architecture, because of the scarcity of examples. Among the religious monuments preceding the 12 th century we find plans, that recall the arrangement of those of Poitou, others with more direct relations to those of Auvergne, for example such is the great church of S. Sernin of Toulouse, the old portions of the cathedrals of Auch and of S. Papoul; finally others constructed on the basis apparently beconging to the county of Toulouse, these are those with which we are particularly occupied.

We have seen that most of the religious edifices of the North, of Poitou, Auvergne and Burgundy proceed from the Latin basilica. In a part of Aquitaine and on the banks of the Rhine, churches have exceptionally been erected without side aisles. In Provence and in the county of Toulouse, we shall find before the 13 th century traces of religious monuments, that proceed from an antique arrangement, the type of which is the b basilica of Constantine at Rome; this is a nave covered by c cross vaults abutted by internal buttresses, between which a are round tunnel vaults.(48). The cathedrals of Marseilles a and of Frejus, monuments almost antique, have still retained this arrangement. In the county of Toulouse, excepting the old portion of the cathedral of Toulouse, which dates from the 12 th century,and is constructed after this system, other edifices preceding the wars of the Albigenses no longer exist; but from the 13 th century, if not after disasters, we shall see reproduced this mode of building religious edifices. In the lower city of Carcassonne, the two churches erected by the inhabitants at the order of S. Louis reproduce this arrangement of the naves without side aisles and with internal buttresses abutting the principal vault; only there the vault with pointed arches has replaced the Roman cross vault, and the bays are much less than the nave, forming as many chapels between the

in the religious edifices of their dioceses. In the 11 th century monastic churches served as models for collegiate churches, parish churches and even cathedrals; in the 13 th century cathedrals in their turn imposed the arrangement of their plans, their system of construction and of decoration on collegiate, parish and monastic churches. The purpose of the episcopate being thus fulfilled, its moral influence predominated at the same time that the material influence of the edifices it had erected with so much ardor at the price of enormous s sacrifices. These great monuments are then venerable to us f from the point of view of art, and as one of the most advanced products of human genius, but also because they recall a prodigious effort of our country toward national unity. Indeed at the end of the 12 th century the enterprise of the episcopate was popular. The feudal power of the abbots was attacked by the dominance of the cathedral. The secular nobility, that had seen with envy the increasing wealth of the monastic establishments, their immense moral influence, aided the bishops in the efforts, that they made to subject the abbeys to their jurisdiction. The urban population saw in the cathedral (and not without reasons) a national monument, as a material representation of the unity of power to which tended all their h hopes. The abbey churches were private edifices, that did not satisfy the religious feeling of the people, while the cathedral was the sanctuary of all, being both a religious and a civil edifice (Art. Cathedrale), whose nave held great assemblies, a sort of sacred forum, that became the guarantee of political liberty at the same time as a place of prayer. It was finally a monument in particular. It is not then astonishing, that the bishops were able to collect rapidly in those times of political and intellectual emancipation the enormous resources, that allowed them to rebuild their cathedrals at all points of the royal domain. Outside the royal domain, the cathedral developed more slowly, yielding long and until the end of the 13 th century to the abbey churches. It is only by the aid of the predominance of monarchical power over these provinces, that the episcopate erected great religious monuments on the models of those of the North. Such are the cathedrals of Bordeaux, Limoges, Clermont-Ferrand, Narbonne, Beziers, Rodez, Mende, Bayonne, Carcassonne, and these monuments

us content ourselves with imperfect foundations, mediocre materials, but erect a church without an equal in the diocese; it will perish soon, but no matter! It must be built; if it falls, our successors will erect another. " That is how a bishop must reason at the end of the 12 th century, and if he e erred from the point of view of the art, he was in the right from the view of religious unity.

It was then neither by ignorance nor by negligence, that t the architects of the 13 th century built badly, when they d did construct badly, since they did erect edifices irreproachable in construction, but because they were controlled by a moral need accepting no objections, and the proof of this is that in that innumerable number of churches of the second order, collegiate and parish churches, where the penury of resources has produced edifices with very plain ornamentation, but where the art of the constructor appeared the more, the simpler the procedures, the coarser the materials, or the quality inferior. Because even that many of these edifices constructed with parsimony have come down to us after passing through more than six centuries, they are reproached with their poverty, and their builders are blamed! But if they had fallen, if the cathedrals of Chartres, Rheims or Amiens were alone s standing today, would these builders then be irreproachable? (Arts. Construction, Eglise). In our century, political and administrative unity causes all the resources of the country to converge to one end, according to the needs of the time, and yet we see daily the insufficiency of these resources, w when it is necessary to satisfy great interests, such as railways, for example. But in the 12 th century the country parceled by the feudal system was composed of provinces, some p poor and others rich, some full of activity and of intelligence, others devoted to agriculture and not advancing, unable to act together; it was necessary for the effort of the episcopate to be vast to collect the resources, which allowed it in fifty years cathedrals on plans of an extent only attained then, and with a richness of art superior to all that had been seen. Just as in the 11 th century the great development taken by the religious establishments influenced all religious structures of that epoch; similarly at the beginning of the 13 th century, the great enterprises of the bishops are reflected

strength, etc., etc.

The bishops like the architects of that time must obey political and religious requirements, that did not allow them the choice of means. Poor dioceses must erect immense and magnificent cathedrals as well as rich dioceses. And let us not lay the blame on the architects, who were placed in unfavorable conditions with insufficient resources, yet knew with rare s skill how to fulfil the programme imposed by the needs of their time, and to erect edifices approaching their ruin today, but which have lasted not less than six centuries, after having fulfilled their great religious missions. Before judging severely, let us see if the bishops, who concealed their poverty under an appearance of wealth and splendor to concur in the great work of national unity by the unity of religious p power, if the bold architects, who without stopping before material difficulties, insurmountable for us, erected structures still standing, are not more meritorious, and have not developed further the science of skill, than those abundantly provided with all that could facilitate their undertakings.

Painting, sculpture, music and poetry must be judged in an absolute manner, the work is good or bad, for the painter, s sculptor, musician and poet can isolate themselves and have no need for expressing what their minds conceive, but a little color, a piece of stone or marble, an instrument or an inkstand; but architecture is subject to circumstances entirely f foreign to the artist, and stronger than he; now one of the striking characters of religious architecture, inaugurated by lay artists at the end of the 12 th century, is the power of adapting themselves to all contingencies, of permitting the use of the richest ornamentation and the most exaggerated, t that has ever been applied to edifices, or the simplest and most economical forms. If at that epoch some great churches affect an apparent richness, which contrasts with the extreme poverty of the materials employed, that belongs to requirements whose motives have just been indicated; motives of such importance, that they were forced to submit to them. "Before all, the cathedral must be spacious, splendid, shining with glass windows, decorated by sculptures; resources are moderate, no matter! It is necessary to satisfy this religious need, w whose importance is superior to every other consideration; let

or military edifices. That tendency of bishops to place abbey churches in the second rank by a material sign in the eyes of the people; we will further say, this need both religious and political, also so well justified by the disorders introduced within the monasteries from the end of the 12 th century, of restoring unity to the Church, caused the episcopate to make immense efforts to succeed in erecting great and magnificent cathedrals, and explains how some of these edifices, remarkable for their extent, the richness of their architecture and their majestic appearance, were built with negligence and parsimony, have no foundations, or present constructions that by the poor materials employed, scarcely correspond to that appearance of luxury and grandeur.

Wise and thoughtful minds among us seek to demonstrate (we do not know why), that our venerable national religious architecture sins in more than one point, and notably presents t these incredible negligencies in conatruction, that endanger the duration of a certain number of edifices, they wish indeed to take into account these imperative needs more than the artists, and which compelled them in spite of themselves at all times to not employ the means suggested by experience or science. Of these two modes of reasoning, which is most just? The cathedral of Rheims is admirably founded, its piers are built of large and finely selected materials, well set and dressed, and have suffered no displacement; its vaults are solidly and judiciously abutted by flying buttresses properly covered, of reasonable spans, by abutments widely bonded, presenting no cracks, and that cathedral was the prey of a terrible fire, and the carelessness of several centuries has left it exposed to storms, and still may be discovered in its entire structure neither a crack nor a deformation; then the architects of the 13 th century were excellent constructors. W Well the cathedral of Seez was erected on imperfect old foundations, that have yielded everywhere, the materials employed in its construction are of mediocre quality, at all points w was sought economy while desiring to erect a vast and magnificent monument; that cathedral cracks in every part, is dislocated and separated, its ruin is imminent; then the architects of the 13 th century were bad constructors, not founding their edifices, erecting them with materials of insufficient

royalty. But establishments like Cluny in the 11 th and 12 th centuries were in possession of a power quite independent and as extensive as that of the king of the French. A sovereign as weak in character as may be assumed, could not tolerate in his domain a sort of independent state, only amenable to the sacred throne, governing itself by its own laws, having numerous vassals over which the king exercised no rights of suzerainty. Thus we see in the royal domain bishops, that temporally were actural feudal nobles, frequently struggling against the vast power of the abbots, and acquiring very extended powers under the royal suzerainty. The episcopate, having a vassal character towards royalty, was not jealous of it and profited by its increasing power. Thus in the royal domain were erected the great cathedrals, taking as religious monuments an importance superior to that of the abbey churches, while outside the royal domain on the contrary, the abbot dominated the cathedrals. As feudal nobles the bishops found themselves in the age; they had neither the power nor the will to preserve the architectural forms consecrated by tradition; better still, urged by the importance and independence of powerful abbeys, they eagerly seized the means offered them by lay artists in the 12 th century to withdraw themselves from the m monopoly, that the religious orders exercised over the arts as well as all products of intelligence. Then the Church was the most powerful expression of the genius of the peoples, of their wealth and their faith, each bishop must have it much a at heart to exhibit his spiritual power by the erection of an edifice, which should be the material representation of that power, and that by its extent and beauty must place in the s second rank the monastic churches scattered over his diocese. If the great vassal of the king, lord of a province, erected a castle superior in strength and extent to all the castles pretending to rival his own, similarly the bishop of a diocese of the royal domain, supported by the power of his temporal superior, erected a cathedral richer, larger and more important than the abbey churches, that he claimed to be subject to his jurisdiction. Such was that great movement toward governmental unity, that manifested itself even in the bosom of clerical or secular feudalism during the 12 th century, not only in political acts, but even in the construction of religious

the Greek churches. In Normandy and Poitou are also found as a reminiscence the lappings, zigzags, geometrical combinations and the interlacings so common in the Christian architecture of the East.

Note 1. p. 217. This curious fragment was discovered in the ruins of church S. Sauveur of Nevers in 1843 by M. Merimee, i inspector general of historical monuments and by us. It was transferred to the Museum of Arts at our earnest request, and we hope that it is still there. (Annales Archaeologiques. Vol. 2. p. 116 et seq. The engraving is accompanied by a judicious and learned note by M. Didron, to which we cannot do better than to refer our readers).

The crusades had only a very small part in this influence of Byzantine arts on the West, for it is exactly at the moment that the wars in the East take a great importance, that we see western architecture abandon the Gallo-Roman or Byzantine traditions to develop themselves in an entirely new sense. It is explained how religious architecture, so far as it remained in the hands of the clergy, must comprise some oriental e elements by the frequency of the relations of the religious e establishments of the West with those of the Holy Land and t the entire Levant, on the North of Italy, which more than any other part of western territory, had been invaded by Byzantine arts. [1] But when the arts of architecture were practised in France by laymen toward the middle of the 12 th century, these new artists studied and practised their art without having at their command these various sources, from which architects b belonging to the religious orders had been able to resort. T They must take architecture where the monuments had brought it, they profiled by that collection of traditions accumulated by the monastic orders, but in making these combinations in which eastern and western elements are mixed in different proportions, an art belongs to the genius of the native people.

Note 1. p. 219. On Byzantine architecture in France, see t the extract from the articles published by M. Vitet, (issues for Jan., Feb. and May, 1853), p. 36 et seq.

Religious architecture develops in the provinces of France because of the political importance of the bishops or religious establishments. In the royal domains, the monasteries could never rise to a degree of importance equal to that of roy-

eyes of persons, who in archaeology justly only admit facts. In the old church of S. Sauveur of Nevers, that fell in 1839, existed a curious capital from the beginning of the 12 th century, on which was sculptured a church that we give here.(47). That church is entirely Byzantine; a central dome borne on p pendentives, that the sculptor has taken care to indicate naively by transverse arches appearing on the exterior at the height of the roofs; transepts terminated by semicircular apses, masonry construction that recalls the decorated stonework of Greek churches; absence of buttresses, so apparent at that epoch in French churches; coverings that have nothing western; cylindrical tower placed beside the nave and detached from it, contrary to the customs adopted in our countries and conforming to those of the East; rectangular doorway without archivolt; small round-arched windows; nothing is lacking, there is an edifice as entirely Byzantine as S. Mark of Venice, which has nothing Byzantine except its pendentive domes and narthex, and that in plan recalls a single oriental church now destroyed, that of the S. Apostles.[1] Now at Nevers in the 12 th century was a sculptor, who on a capital represents a church that one would believe a little model brought from the East; or i indeed that sculptor had been in Greece or Syria, or some one had sent him for reproduction an imitation of a Byzantine church, in either case this proves that at that epoch, in the midst of the countries where the religious monuments built had almost nothing, that recalls Byzantine architecture, neither in plan nor details of ornamentation, the arts of the E East were not ignored and consequently must exert an influence. Only as we have already said (Art. Architecture), this influence was not produced everywhere in the same manner. This is an art more or less well studied or known, that each country employs according to the needs of the moment, either to construct, to plan, or to decorate its religious edifeces. In Perigord, Angoumois, a portion of Poitou and of Saintonge, the dome on pendentives is taken from the East. In Auvergne it is the dome on trumpets formed by concentric arches, masonry f figured and polychrome. On the banks of the Rhine, the grand arrangement of plan and the ornamentation of the architecture reflect the Byzantine arrangement and decoration; in Provence the refinement of the mouldings and the polygonal apse recall

with transepts ending in semicircular apses, such as the cathedrals of Noyon, Soissons, Bonn on the Rhine, Church S. Macaire-en-Garonne, we can scarcely regard that influence longer as oriental, since the church at Bethlehem is a Roman basilica covered by visible carpentry, differing from S. Paul-w-t-W, for example, only by the two apses opened in the two gable w walls of the transverse aisle.

Note 3. p. 216. Dom Plonchet. Hist. de Bourgogne. Mobillon. Annal. Benedict. Vol. 4. p. 1-2.

The true Byzantine types are S. Sophia of Constantinople, the little churches of Greece and of Syria erected during the reign of Justinian, churches with a dome supported on four p pendentives. (Art. pendentif). Now these monuments have no d direct and well marked influence except on the banks of the Rhine, because of the predominance given to the arts of the East by Charlemagne, especially in the western part of Aquitaine by the imitation of S. Mark of Venice, and in Provence by the constant relations of the merchants of Bouches-du-Rhone with Greece, Constantinople and the shores of the Adriatic. B Besides if the Byzantine influence was felt everywhere, it was unknown to artists, so to speak, it was by an influence more or less pronounced, due in great part to the introduction of art objects, fabrics and oriental manuscripts into the different provinces of Gaul, or by imitations at second hand executed by local architects. In the 11 th and 12 th centuries the relations of the West and the East were comparatively far more intimate than today. Without considering the crusades, that hurried into the East thousands of Bretons, Germans, French, Italians and Provencals, one must not lose sight of the importance of the oriental monastic establishments, which maintained direct and constant relations with the monasteries of the West; commerce; the ancient predominance of the arts and sciences in the Byzantine empire; the extreme civilization of t the Arab peoples; the beauty and richness of the products of their industry; then finally for what particularly concerns religious architecture, the veneration that all western Christians held for the edifices erected in the Holy Land. An example, at first view resting on a very fragile base, but which in fact is of great value, particularly supports the last remarks, and takes from them what might be hypothetical in the

the reign of Constantine, and that after all were Roman as m much as the Holy Sepulchre; from the 5 th to the 12 th century were built in the West a considerably large number of round churches. At Paris Childebert caused to be erected the church of S. Vincent (now S. Germain l'Auxerrois), that was named S. Vincent the Round.[1] At the left of the portal of the cathedral of Paris existed a chapel; that had retained the name of S. John the Round.[2]

Note 1. p. 216. T. des Antiq. de Paris, by J. Du Breul. Book 3. Paris. 1634.
Note 2. p. 216. The same, Book 1.

At the abbey S. Benigne of Dijon man be seen the lower story of the rotunda commenced in the 7 th century behind the apse of the church. That rotunda had three stories including the crypt, with galleries around it as at the Holy Sepulchre.[3] Charlemagne had erected the circular church of Aix-la-Chapelle, imitated in the 12 th century in the abbey of Ottmarsheim. In the 11 th century at Newry S. Sepulchre near Chateauroux were laid the foundations of a church reproducing the arrangement of the Holy Sepulchre of Jerusalem. In the 12 th century was built the great abbey church of Charroux, whose nave was terminated by a vast rotunda with triple aisles (S. Sepulchre). At the same epoch at the lower end of Languedoc, the church of Rieux-Minervois was built on a circular plan preceded by a little porch. And as if to emphasize the importance of certain traditions, we again see quite in the 16 th century, that Catherine de Medici had erected at the North of the abbey church of S. Denis in France a circular monument with side aisles in two stories, like the Holy Sepulchre in Jerusalem, to shelter the tombs of her husband and his successors. When the religious and military order of the temple was instituted, t the commanderies of that order took as the type of their churches or rather of their chapels (for these monuments are all of small dimensions), the plan of the Holy Sepulchre at Jerusalem.(Art. Temple). But if one may regard these circular edifices as proceeding from an oriental influence, because the mother edifice serving as original was in the East, he cannot always consider them as Byzantine, since the Holy Sepulchre of Jerusalem is a monument of the Roman decadence. Likewise if we take the church of the monastery of Bethlehem as the type, that in the 12 th century caused the erection of churches

these successive transformations.

Before proceeding farther, we should explain what we understand by Byzantine influence and Byzantine architecture to m make it understood how, that an influence was exerted on the religious architecture of the territory comprised between the Rhine, the Rhone and the ocean.

There exist in the East three type plans applied to churches, the oldest is the circular plan, of which the Holy Sepulchre of Jerusalem is one of the best known models. The second type is derived from the antique basilica, but with transepts terminated by apses, such being the church of the Nativity of the monastery of Bethlehem (43); the third is the Byzantine p plan properly so called, composed of a central dome placed on pendentives with four openings toward the cardinal points, l lateral galleries, one or three apses at the East, and a narthex at the entrance side. Such is the church S. Sergius at Constantinople (44), earlier than the great church of S. Sophia given here (45). Such with certain modifications are the little churches of Athens, one of whose types is presented. (Church of Kapnikarea). (46). These monuments, although very different in dimensions and the mode of construction, are derived from the same principle. This is always the central dome on pendentives, abutted by lateral tunnel vaults, by cross v vaults or by half domes. The circular church terminated by a dome with central opening or windows pierced in the base of the vault, was rather a consecrated place, an enclosure designed to preserve divine vestiges, like the church of the Ascension at Jerusalem, [1] or a tomb like the Holy Sepulchre, than a church in the true acceptation of the word. Yet this primitive form, adopted from the epoch of Constantine, had an influence on all Christian edifices erected in the East, in which one finds always the central dome, unless exceptionally the system of the Roman basilica was not entirely applied, as in the church of Bethlehem. (43).

Note 1. p. 215. See Architecture Monastique, by Albert Lenoir. p. 219 et seq. Paris. 1852.

From the first ages of Christianity, it appears that the c circular plan adopted in the East also exterted in the West a notable influence on religious architecture. Without mentioning the numerous circular edifices erected at Rome under t

that are abutted by lateral transverse arches turned from A to C and B to D; the parallelograms A C D B were covered by an inclined ceiling simply formed by rafters, as indicated by the Fig. (41). But then if the central aisle was easily vaulted because of the square arrangement of each bay A B B A, the side aisles could be so only by an oblong vault, and the difficulty that stopped the architects of Champagne, when they desired to vault the central aisles, avoided in that case for them, recurred in the side aisles. Even admitting that the obstacles preventing the construction of cross vaults on a rectangular plan were conquered by causing the penetration of half cylinders with diameter C A into two great half cylinders with diameter A B, the side arches would have had their c crowns at the level of the archivolts A B; hence by the inclination of the roofs they would mask the twin windows pierced beneath the side arches of the great vaults. The system of r rafters simply extending from A B to C D and forming an inclined ceiling had the advantage of not losing the height of the roofs of the side aisles. This carpentry was destroyed by a fire, and in the 12 th century the constructors rejected inclined ceilings and wished also to vault the side aisles; they then established between the piers of the 11 th century (40) smaller piers E to obtain square plans E B D F, on which they could easily build cross vaults composed of equal intersecting half cylinders, whose crowns did not rise far enough to prevent finding height for the roof between H and K.(Fig. 42). [1]
This arrangement of cross vaults on square plans over the naves and side aisles by means of an intermediate pier set between the principal piers, is found again in the 12 th century in the cathedrals of Mentz and Spires, in the curious church of Rosheim, and in many religious edifices of Alsace and Lorraine, not as at S. Die obtained by a modification of the primitive plan, but definitely accepted as a procedure for vaulting both the central naves and the side aisles, and this problem being once solved, constructors in Alsace and Lorraine applied it up to the time, when the architecture of the royal domain invaded there.

Note 1. p. 213. This construction was again modified in the 13 th century by the erection of new vaults over the nave abutted by flying buttresses; but one readily finds traces of

are seen, the mouldings and the ornamentation of the French architecture of the beginning of the 13 th century, adapted to a plan and an arrangement of the construction belonging to Carlovingian traditions.

Note 1. p. 209. Book 2. Gregory of Tours says, speaking of the church built at Clermont by S. Numatius:-- "Before it is an apsis of round form." We may understand, "an apse at the entrance end;"which does not exclude the apse of the sanctuary. Gregory of Tours. Vol. 1. p. 180. Edition Renouard. 1836.

Let us then examine how the constructors of Lorraine or rather of the provinces situated between the Rhine, Champagne and Flanders, proceeded in the 11 th century in solving the problem so frequently attempted, of placing the vaults over the naves of Latin basilicas. We have stated that no difficulty existed for apses whose semicircular portion, without side aisles and radiating chapels, was domed, and whose parallel sides were strongly buttressed by square towers built over s small chapels opening into the crossiug; but for the naves w with their side aisles it was necessary to apply a system of vaults, that would not push the walls over outside, when was rejected the visible covering. (For in those countries as everywhere, fires ruined religious edifices from foundation to roof). In a poor and little visited church we shall follow s step by step the attempts of the constructors of Alsace and Lorraine. It is interesting to study certain edifices, otherwise of little importance, but which by the modifications suffered by them give the history and progress of an art. Such is the cathedral of S. Die. Built during the second half of the 11 th century, this church probably presented then the Rhenish plan adopted in the cathedral of Verdun; the eastern apse was rebuilt in the 14 th century on the old foundations; as for the western apse, it was replaced, if ever erected, by a modern facade; but the most interesting part for us today, the nave, still exists; here (40) is the plan of this nave. We have indicated in black the construction of the 11 th century, and by hatching the changes made to the primitive plan during the 12 th century; the piers A B supported cross vaults according to the Roman method, i.e., by the intersection of two half cylinders, separated by transverse arches; twin windows light the nave beneath the side arches of these vaults,

cloister; at B and I are towers; Probably there existed at C, the centre of the eastern transept a pendentive dome borne by corbelled arches or small pendentives, as at Spires, Mentz a and Strasburg. These arrangements nowise recall those adopted in the 12 th century in the churches of the royal domain, of Normandy, Poitou and Aquitaine. There enters into these plans an element foreign to Latin traditions, and this element had been introduced into Austrasia after the epoch of Charlemagne; it is scarcely to be doubted, that it was the product of an oriental influence, like a mixture of the Latin basilica and the plan of S. Sophia of Constantinople. But if the architects of Austrasia, by reason of traditions transmitted to them, no longer experienced in the 11 th century difficulties in v vaulting the apses and the domes of transepts, they found themselves in the same embarrasment as all their colleagues of the West, when it was necessary to vault naves arranged on the Latin plan; on another hand because even they had not ceased to build vaults, aod that Roman traditions were very well preserved in Austrasia, they applied the antique cross vault with less hesitation than the constructors of Ile de F France. and of Champagne; without the intermediary of the tunnel vault, they constructed like the architects of Burgundy and of the central provinces, and without seeking in the pointed arch a means of diminishing the thrusts. Thus in the provinces of ancient Austrasia, the pointed curve only appeared very late or exceptionally, not as a necessity, but as the r result of an influence,of an inartistic method toward the middle of the 13 th century. Betueen monuments purely Rhenish a and the cathedrals of Strasburg and of Cologne, for example, a transition can scarcely be perceived; the Romanesque method of the East is continued until the moment, when the architecture of the royal domain, studied and completed, carried to the last degree of perfection, makes a sudden invasion, and comes to establish its rules on the banks of the Rhine as in all the provinces of France. One indeed sometimes meets in the Austrasian provinces the use of the style adopted at the beginning of the 13 th century in the royal domain, but only the form of that architecture and not its principle is accepted, and that is very striking in the great round hall built at the North of the cathedral of Treves, where all the forms

during the 11 th and 12 th centuries churches were erected ac according to a special method of plan and system of construction. Several of these religious edifices possessed two opposite apses, one at the East and the other at the West. This was a very ancient arrangement, traces of which we find in t the History of Gregory of Tours. [1.] As if to support the text of that author, we still see at the cathedral of Nevers an apse and a transept at the East side dating from the 11 th century; the floor of that apse is raised above a crypt or confessio. The author of the plan of the abbey of S. Gall (Architecture Monastique) in the curious drawing, that has come to us from the 9 th century, traces a great and a small church, each with two apses, one at the entrance side, the o other for the sanctuary. On the particular Carlovingian territory, the cathedrals of Treves and Mentz, the abbey church of Laach (11 th, 12 th and 13 th centuries) among others, possess apses at the West as at the East. The cathedrals of Besancon and of Verdun present similar arrangements, modified today, but whose outlines are perfectly visible; the latter cathedral even has two transepts before its apses and four towers placed in the reentrant angles formed by the transepts a accompanying the apses. Winding stairways of great importance flank the two towers of the western end; this system is found more frankly accented in the cathedral of Mentz, the abbey c church of Laach, and it is already indicated in the plan of the abbey of S. Gall. When one visits the cathedral of Strasburg, he is struck by the similarity of the construction of the choir to those of the cathedrals of Mentz and of Spires, and there is reason to believe, that in the 12 th century Notre Dame of Strasburg possessed its two apses like most of t the great Rhenish churches. Here (39) is the plan of the cathedral of Verdun, as it was at the end of the 12 th century, with the removal of all the additions that disfigure it today; at A is the sanctuary formerly much elevated above the floor of the nave, with a crypt beneath as at Spires, Mentz, Besancon and Strasburg. There still exist at Verdun traces of this crypt or confessio beneath the chapels B, which were raised to the level of the sanctuary; C is the eastern transept, D the nave, E the ancient entrance, F the western transept, G the western apse, today changed into a vestibule; H is a clo-

simple parish churches erected in their vicinity. The porches of Cluny and of Citeaux are found again in the cathedral of Autun near Cluny, the collegiate church of Beaune, the churches of Burgundy and Maconnais; only these porches open on their three sides and form only a closed ante-nave. The rule of Citeaux has a still more marked influence on religious structures near those great establishments. In the royal domain the cathedrals adopted the towers of the great Benedictine Cluniac ch churches. The cathedral of Laon possessed and still has in p part two towers crowned by spires on the facade, four towers at the ends of the transepts, and a square tower on the transverse arches of the central crossing. Chartres presents the same arrangement, excepting the central tower; Rheims, that queen of French churches, before the fire at the end of the 15 th century was furnished with its six towers and a central bell tower terminated by a wooden spire; the same at Rouen. Particularly in Normandy the central towers have taken a great importance in the monastic churches as well as in the cathedrals or the parish churches, and their stories decorated by open galleries are seen in the enterior, forming a kind of immense lantern furnishing air, light and space in the centre of the edifice. The churches of S. Etienne and of the Trinite of Caen, of the abbey of Jumieges, the cathedrals of Coutances and of Bayeux, [1] and a number of small churches, possess central towers, thus forming a part of the interior of the church, and not merely bell towers, but rather domes or lanterns imparting grandeur and clarity to the centre of the edifice. On the other hand, the bell towers of the facades of Norman churches are small and are terminated by stone spires excessively acute. In Ile de France central towers are rare; when they exist, they are rather bell towers with wooden spires, not visible in the interior of the edifice, while the facade towers are large and high, constructed with luxury and strength, as on the churches of Notre Dame of Paris and of M Mantes. (Arts. Tour, Fleche, Clocher).

Note 1. p. 208. This primitive arrangement at Bayeux was modified in the 13 th century by the construction of a vault at the centre of the crossing.

In the East of France on the banks of the Rhine, where Carlovingian architecture left monuments of great importance, d

latest arrangements adopted. However the construction of the chapels of the body of the cathedral of Paris much precedes the adoption of this system in the other churches of the royal domain. At Rheims, the body, whose front portion dates from about 1250, has no chapels; at Amiens they were established only during the 14 th century; at that epoch were scarcely a admitted side aisles without chapels, and the plans of the b bodies of the cathedrals of Clermont-Ferrand, Limoges, Narbonne and Troyes were conceived with chapels. Those of the cathedrals of Laon, Rouen, Coutances and Sens were modified to receive them from 1300 to 1350.

The naves of churches belonging to the rule of Cluny were preceded by an ante-nave or enclosed porch having great importance, as at Vezelay, Charite-sur-Loire and Cluny itself, these porches being surmounted by two towers; four other towers also accompany the two transepts, and a central tower crowns the crossing. This arrangement dates from the 12 th century, but is not not adopted in churches of the rule of citeaux; the naves are only preceded by a low porch, also closed but of small depth; the gable of the facade is not flanked by towers nor the transepts; a single spire rises over the crossing; such were the churches of Clairvaux, Fontenay, Morimond, Portigny, etc. This luxury of towers could not suit the austerity of t the rule of Citeaux; the religious of that order only allowed the strictly necessary; a single tower over the middle of the church must suffice for the needs of the monastery. (Art. Architecture Monastique). The cathedrals of the royal domain at the end of the 12 th century took from the great monastic churches a part of their arrangements, while rejecting others. They must be widely open to the multitude; these closed porches restricted and obstructed the entrances, were so very appropriate for the requirements of monasteries, but did not suit the cathedrals; so they were rejected. men were satisfied by very open porches as at the Cathedral of Laon, that of Chartres (see that cathedral), or even about the beginning of the 13 th century by splayed portals, opening directly on the street as at the cathedrals of Paris, Amiens, Rheims, Sens, Seez, Coutances, Bourges, etc. But such was the influence of the g great abbey churches in the provinces, that we see their arrangements continued in the cathedrals, the collegiate or the

stone slabs. (38).

New needs, experience of the constructors, customs of wealth and luxury, thus rapidly modified the religious architecture during the 13 th century. In the royal domain all the old Romanesque churches were replaced according to an entirely new fashion. The religious edifices, that during the 12 th century had shown so much splendor, and which were the possessors of immense properties, had erected great churches, tended toward the decline already in the 13 th century, allowing to remain only the monuments marking the epoch of their magnificence; the priories, the poor pasish churches were compelled to retain their Romanesque churches, replacing carpentry by vaults as much as possible, and begun partial constructions, that t the lack of means often ogliged them to leave incomplete; but all, rich or poor, were possessed by a passion for building, and to replace the old Romanesque edifices by elegant structures erected with prodigious rapidity. The bishops headed this movement, and in the northern provinces caused the rebuilding of their cathedrals on new plans, that were modified and enlarged when scarcely completed. The great cathedrals erected f from 1160 to 1240 were only provided with chapels at the apse. As previously stated, the naver were only accompanied by double or single side aisles. Among others, the cathedral of Paris was probably deprived of chapels, even at the apse; those of Gourges and of Chartres have only small absidal chapels s scarcely able to contain an altar. In 1230 the cathedral of Paris was finished (Art. cathedrale), and already in 1240 the walls of the side aisles of the body were opened to establish chapels lighted by windows with tracery between the projections of the buttresses. This opeation continued to about 1260 along the parallel sides of the choir, the two transept gables being entirely rebuilt with rose windows and open tracery above, the upper windows of the nave and choir were made wider and extended to just above the archivolts of the gallery of the second story; consequently the vaults of this gallery were modified, and finally at the beginning of the 14 th century were established great chapels entirely around the apse. Such was the desire to satisfy the needs and tastes of the moment, that men did not hesitate to rebuild from ground to roof entirely new an immense edifice, to place it in harmony with the

primitive system, and gutters had been placed at the base of the roof of the side aisle only at C, with projecting stone gargoyles without sculpture. But when very great churches were erected, the distance between the roofs A and B was such, that the water, driven by the wind, struck the walls, and the glass of the windows not being tight, it penetrated into the interior; tiles displaced by the wind fell from the upper roof on the roof of the side aisle, causing considerable damage to t the coverings; from 1200 to 1220 were placed courses forming a crowning walk here at the bases of the great roof, and the water escaped along the cornices, whose projections was quite pronounced.(Arts Larmier, Cheneaux). Thus the discharge of r rain-water is arranged at the cathedral of Chartres. These crowning courses set at the base of the roof were soon hallowed into gutters directing the water through gargoyles projecting with the flying buttresses furnished with channels (Art. Arc-Boutant); then these gutters were bordered by balustrades, which permitted establishing at the top of the edifice a walk useful for watching and maintaining the roofs, opposing an o obstacle to the fall of tiles or slates from the upper roof on the lower covering. The more important the relegious edifices became and the higher, the more necessary it was to render access easy to all heights, either to repair the roofs, the glass windows and the external masonry, or to hang tapestries and ornament the interiors on great solemnities. It was then not without reason, that on the exterior was established sufficiently broad passages around the entire exteriors of religious edifices; at the base of the roofs of the side aisles at D (35, 36), above the triforium at E, at the base of the g great roofs at F; in the interior in the triforium at G. To not interrupt the passage at the great piers in the great religious edifices of the 13 th century, a passage was arranged in the interior behind the piers at H, on the exterior at I between the pier and the column receiving the springing of t the flying buttress. Later the constructors having recognized, that these passages had frequently inbured the stability of the edifices, they built their piers solid, carrying around them passages in the triforium and above behind these piers, as may be observed in the cathedrals of Narbonne and of Limoges; but then the side aisles were covered by terraces of st-

supports absolutely necessary to bear the vaults, dividing e even these supports into groups of columns to avoid flat surfaces, so that they also opened the triforiums and made them stained glass windows. This transition is very apparent at A miens. The nave of the cathedral of Amiens was erected from 1230 to 1240, and it possesses a triforium with a solid wall behind the roofs of the side aisles (35); the upper work of the choir was erected from 1255 to 1265, and shows us a triforium with glazed openings; so that there existed in this choir thus opened, of plane walls only the triangles comprised between the archivolts of the side aisles, the compound piers, and the sills of the triforium; i.e., an area of 215 sq. ft. of plane wall for an area of about 3611 sq. ft. of voids or of piers divided into little columns.

The upper parts of the choir of the cathedral of Amiens is not the first attempt with a pereforated triforium. Already the architects of the choir of the cathedral of Troyes, the nave and choir of the abbey churbh of S. Denis built about 1240, had considered the triforium as an actual extension of the upper window; we give (36) a perspective of one bay of t the nave of the abbey church of S. Denis, which illustrates this last system since then adopted in nearly all the great churches of the royal domain. But to glaze and allow light to pass through the openings made at A in the old wall closing the roof of the side aisle, it was necessary to suppress the roof with single slope, to replace it by a covering B with two slopes or by a terrace. The construction of a gable roof required a gutter at C and complex channels for water. Thus passing to the rigorous consequences of the principle they h had adopted, every time that the architects of the 13 th century desired to perfect this method in architecture, they were led to overturn their system of construction, of covering and removal of water; they never hesitated to adopt a frank method.

In the religious edifices of the Romanesque epoch, the water from the roofs naturally ran off the eaves of the roof without gutters to collect it and conduct it to the exterior. The rain that falls on the great roof A (37) drops on the roof of the side aisle B and falls from thence to the ground. From the b beginning of the 12 th century in rainy climates, such as Normandy, had already been recognized the inconveniences of this

possible was it to think of painting historical subjects on the plane surfaces of the walls. There is a question of colored glass in very ancient religious edifices, at an epoch w when windows intended for lighting were very small; we do not know how these glass windous were treated, since none exist anterior to the 12 th century, but it is certain that with t the mode of coloring and arrangement of the most ancient glass windows known to us, it is impossible to make a harmonious p painting, other than a painting of ornament. On bases, surfaces of walls, near the eye, frescos may still sustain the translucent coloring of stained glass, but at a great height t the radiant effect of colored glass is such, that it crushes all shaded painting. The attempts made recently in some of o our religious edifices to ally mural paintings of subjects w with stained glass only confirsm our opinion, we believe. In this case, either the stained glass appears hard and discordant, or the shaded painting seems weak, poor and dirty, The flat ornamentation with colors very much divided, and forms strongly outlined by wide black lines only suit frank and simple tones, and is the only kind that can be placed beside colored glass, even accenting their brilliant harmony. (Arts. peinture, Vitraux). Occupied as much by the decorative effect of the interiors of their religious edifices, as by the system of construction, that seemed to them to have been definitely adopted, the architects of the 13 th century found themselves led gradually, in order to satisfy the demands of the new art introduced by them, to suppress all the plane surfaces of walls in the upper part of these edifices. Not being able to harmonize large painted surfaces with stained glass windows, further recognizing that the stained glass windows are certainly the most splendid decoration, that could suit the interiors of monuments erected in climates in which the sky is most frequently cloudy, that the colored glass enriches the pale light of our country, make resplendent in the eyes of believers a vivid clarity in spite of the gray and gloomy sky, they profited by all apportunities presented for opening new windows, so as to fill them with stained glass. In the gables were pierced rose windows, that entirely filled the space left beneath the vaults; side arches were made the archivolts of the upper and lower windows; between these windows were only left

the buttresses receiving the upper flying buttresses; they e even encroach on their thickness. (Arts.Arc-Boutant, Fig. 60). Cathedrale). There is no triforium between the archivolt of the entrances of the chapels and the side arch of the vaults of the side aisles as at Beauvais, whose choir is an exception, the triforium only existing between the archivolts of the side aisle and the sills of the upper windows. But here it is again necessary to return backward. We have stated and shown by examples, that the triforium in churches built from 1160 to 1220 was pierced in the walls abutting the roofs of the s side aisles. In the 11 th and 12 th centuries it opens on vaulted galleries in the edifices of the centre of France, such as the church of Notre Dame du Port (10). But in Champagne, Normandy and the royal domain, the triforium is one opening beneath the carpentry of the side aisles and lighting them. (Art. Triforium); from the middle of the nave one could then see the trusses, rafters and the bottoms of the tiles of these coverings, through the arches of the triforium, and it is thus in the cathedrals of Langres and Sens, and in many churches of the second order. The view of the underside of this dark carpentry was not agreeable, and the roofs not being perfectly closed, allowed air and dampness to enter the church. To avoid these inconveniences, from the first years of the 13 th century, the triforium was closed on the side next the carpentry by a thin wall resting on discharging arches, and became only a narrow gallery allowing passage within the church below the sills of the great upper windows. In the nave of the cathedral of Amiens, at Notre Dame of Rheims, at Chalons and in nearly all the churches of the North, whose construction dates from the first years of the 13 th century, matters are so arranged. But in the 12 th century was adopted a mode of decoration of religious edifices, that assumed considerable importance; we mean stained glass. Mural paintings, very much used in preceding centuries, could not compete with these brilliant stained windows, that while presenting subjects perfectly visible in the darkest weather, allowed the light to pass and attained a richness and intensity of color, that paled and completely e effaced the frescos painted near them. The more the architectural system adopted compelled enlargement of the openings, the more were they filled with stained glass, and the less p

architecture happy proportions. Now this problem is far from being solved at Bourges. The single piers of the nave are too high in proportion, the windows are short, the triforiums are crushed, the first side aisle is out of proportion to the second.

If double side aisles were useful in the vicinity of the transepts and choir, they were almost useless in the body, only serving for processions, they were soon omitted; only while retaining but one side aisle in the body of cathedrals, they were made wider. The narrowness of the double or single side aisles of churches of the end of the 12 th century and of the beginning of the 13 th was caused by a fear, that their vaults would push the piers toward the interior. (Art. Construction).

In the choir of Beauvais, built ten years later than that of Bourges, is the same arrangement for the single side aisle, that affords entrance to the chapels; a triforium is pierced in the wall abutting the roof of these chapels, and windows directly lighting the choir are opened under the vaults . At the cathedral of Mantes the choir with double side aisles, b built during the first half of the 13 th century, presents t the same section as that of Bourges, but much better studied, the ratio of the proportion between the two side aisles is b better (Art. Cathedrale), the upper windows are longer, the radiating chapels are more developed, and the entire system of construction is more skilful. But a simple and broad system was adopted in the royal domain for the construction of churches after 1220. Same as in the body the narrow double side aisles were replaced by a very wide single aisle, the narrow double side aisles in the choir were rejected, which compelled the constructors at Chartres, Bourges and again at Mans, to give but a moderate height to the radiating chapels, There was felt a need of enlarging the chapels, consequently for raising and lighting them abundantly. If in Notre Dame of Paris of Maurich of Sully there existed apsidal chapels, which is doubtful, they could only be very small and low. (Art. Abside). At Bourges and Chartres these chapels are still only niches, suited to contain only the altar; they are spaced apart and allow the side aisles to receive direct light between them. At Rheims and especially at Amiens, these chapels are as high as the side aisles and profit by all the space between

second story were omitted, men contenting themselves with the triforium constructed in the wall abutting the roof of the side aisles by giving it a greater importance. The cathedral of Beauvais shows us that curious transition from the great churches with vaulted galleries and doubled side aisles like Notre Dame of Paris, to the definitely Gothil, such as the c cathedrals of Rheims, Amiens, Mans and particularly Beauvais. Bourges is Notre Dame of paris without the galleries in the second story. The cross section of that vast cathedral given here (34) shows us the first side aisle without the gallery above it in the cathedral of Paris. The isolated piers rise to the vaults, that are in the second story at the cathedral of Paris, the windows B, that at Paris can light the nave only by light passing through the openings of the upper gallery, directly light the nave at Bourges. The second side aisle C is alone reduced to the proportions of that at Paris, and is lighted directly by the openings D. Two triforiums E, E deco-rate the walls abutting against the two roofs F, F of the two side aisles. The vaults are lighted by the windows G pierced above the roof of the first side aisle surmounted by its gallery as at Notre Dame of Paris. At Bourges perhaps more than elsewhere, one perceives the efforts of the constructors to restrict the height of religious edifices within the strictest limits. Let us examine this cross section; it is impossible to construct an external aisle lower than the aisle C; it must be covered and the height of the first roof is necessarily g given by the slopa suitable for tiles; the nave must be lighted and the windows B are wide and low, and control the height of the side aisle A; a roof must also be placed over the vaults of this side aisle, and the height of this roof gives the sill of the windows G; these upper windows are themselves short and of depressed proportions, and they give the height of the great vaults. Same proportions of the nave as at the cathedral of Paris; the nave of Bourges has a height under the cr crown of about three times its width. So then before seeking a symbolic idea in the height of Gothic naves, let us first see a necessity against which the constructors struggled for fifty years before reaching the solution of the problem, that is, to erect great vaulted edifices of great width, to make them stable, to light them, and to give to all parts of the

the south transept of Soissons and the cathedral of Laon. Now that church was erected in haste and had bad foundations; such movements appeared in the masonry shortly after its erection, that it was necessary to make important repairs; among these it was necessary to cause the demolition of the vaults of the side aisles of the choir, so that the side aisle was doubled in height; in the parallel bays of the choir were allowed to remain the archivolts and the openings of the suppressed gallery, which continued to stay the piers parallel to the axis of the church. At the same time from 1200 to 1225 was constructed the nave of the cathedral of Rouen, where by intention was established an arrangement, similar to that caused by accident at the cathedral of Meaux, i.e., all the piers of the nave were stayed between them parallel to the axis of the church at nearly half their height, by meaos of a series of archivolts imitating a gallery on the second story, that does not exist and never existed. At Eu is the same arrangement. The choir of the abbey church of Eu had been erected as well as the transepts, and the last bay of the nave, with side aisles and a vaulted gallery over them in the second story in the last years of the 12 th century. The nave was built a little later toward 1225, and as at the cathedral of Rouen, with only a simulated gallery, rejecting the vaults of the side a aisle and carrying these up to the vaults of the gallery. Then but timidly in some countries at least, men risked giving a great height to the side aisles and suppressing the vaulted gallery of the second story, or rather to benefit the side aisles by the entire height of that gallery, retaining only the triforium placed in the wall covering the side roof. Yet already architects, bolder or more certain of their materials, from the first years of the 13 th century, had built great c churches, for example like the cathedrals of chartres and of Soissons, without the gallery in the second story over the s side aisles, or without stories imitating those galleries and rendering the piers of the nave more stable. What is certain is that at the beginning of the 13 th century were no longer accepted the low side aisles, the need of raising them being felt and the lighting of naves by great windows pierced in the walls of the side aisles, and not desiring to raise the vaults of the naves out of proportion, the galleries of the

Better still, in Champagne, where the naves of the churches of cities or villages retain the visible carpentry until toward 1220, and one still finds arrangements, such as are indicated in the figure. (33). To economize in height, the windows of the nave are pierced above the piers; the transverse arches of the vaulted side aisles bear the eaves, and these side aisles are covered by a series of gable roofs perpendicular to the nave and closed by connected gables. It is difficult to find a construction less expensive for a country in which stone is scarce and wood is common, taking a smaller height in proportion to the width, at the same time that it allows daylight to enter the interior everywhere. This system was adopted in many little churches of Normandy and of Brittany, but later and with vaults over the central nave. In this case the windows of the nave are necessarily opened above the archivolts of the side aisles, so as to cause the springings of the great vaults to be borne on the piers, the external gables s straddle the transverse arches of the side aisles, and the g gutters are on the middles of the vaults; the windows lighting these side aisles and pierced under the gables are then twin windows, to allow the piers supporting the vaults of the side aesles to pass behind the pier separating them, or rather are found at the junctions of the gables, which is very u ungraceful. (Art. Eglise). We repeat that the architects of the beginning of the 13 th century, far from pretending to g give a great height to the interiors of their edifices, on t the contrary strongly proposed to reduce these heights, as m much for reasons of economy as for stability. But they did n not dare to give to the isolated piers of the nave a considerable height. The vaulted gallery of the first story appeared to them evidently useful for the stability of the great edifices, it had been transferred to them by tradition, and they did not believe that they could do without it, it was for them like a story that fixed the piers of the nave; they did not yet freely adopt the system of equilibrium, that soon became the principle of Gothic architecture.

After the first great years of the 13 th century the cathedral of Meaux was built; it possessed side aisles with vaulted galleries in the second story, with triforium taken in the thickness of the wall closing the roof of the gallery, as at

transept is exceptionally in the form of a semicircular apse, like that of the cathedral of Noyon (Art. Transept), a sacristy or treasury in two vaulted stories flanks it on its east side. (30). By examination of the plan one can recognize the work of a skilful architect. This side aisle is composed of strong piers beneath the ribs of the great vault, and of single columns to bear the springings of the little vaults of t the side aisles, and is in much happier proportion than the side aisle of the choir of Notre Dame. The construction is h here at the same time light, and perfectly stable, the proof being that it is still well preserved in spite of the terrible shock caused by the explosion of a powder mill in 1313. As at Notre Dame of Paris, Noyon, S. Remy of Rheims, over the side aisle is a vaulted gallery; but at Soissons the wall receiving the roof of that gallery is decorated by a triforium, a narrow passage in the thickness of the wall, the triple windows entirely filling the spaces between the piers, are happy in proportions, and fully light the centre aisle. Here (31) is an internal bay of this apse.

In the choir of the church at Mantes the architects of the end of the 12 th century, same as at Notre Dame of Paris, had erected a gallery over the side aisle, but they had vaulted that gallery by a series of pointed tunnel vaults resting on lintels and columns supported by the lower transverse arches. Here these tunnel vaults are rampant (32), for the side arches A B C of the inner side having a shorter base than the external side arches F D E because of the radiation of the apse, the crown E is higher than the crown C, and these tunnel vaults are parts of cones. This arrangement facilitates the introduction of light into the interior by the great rose windows opened beneath the side arches F D E. The examples so given tend to demonstrate, that the purpose of the constructors at that epoch in the royal domain was :- 1, to vault religious edifices; 2, to light them abundantly; 3, to not allow themselves to give them to great height beneath the crown. The f fulfilment of these three conditions is required by the construction of little as well as of great churches. The rose windows allow large openings, and are sometimes pierced beneath the side arches of the vaults of the nave, above the roof of the side aisle, as in the church of Arcueil, for example.

the appearance of this vast church only seemed majestic and unified, easy to understand (28); but it was not the same in the interior, where appeared serious defects in prxportions. The side aisles are not only low, crushed, but they have the inconvenience of presenting heights of the arcade nearly equal to those of the galleries; the plain wall was above the archivolts of the second story and must seem heavy over the opening, and was quite badly pierced by the windows lost beneath the side arches of the great vaults. (29). It seems (and one can still consider that effect by examining the first bay of the nave left in its primitive state), that the constructors were embarrassed iu completing an edifice commenced on a vast and grandly conceived plan. Up to the height of the gallery is f found a certainty in the means of execution, a freedom that is lost in the higher works, on the contrary betraying a certain timidity. It is indeed, that up to the sills of the upper windows, the traditions of Romanesque construction serve as a guide, but above that it was necessary to employ an entirely new method of construction.

These difficulties and defects do not appear in the same d degree in the apses of the great edifices of that epoch, in consequence of their circular plan, the structures manifest themselves more easily; the upper vaults do not exert in the apses a thrust comparable to that of the vaults acting on two parallel and isolated walls; maintained on the lower piers by a law of equilibrium and not by their own stability. These p piers are closer in the choir because of the radiation of the plan (Art. Cathedrale), give a less stumpy proportion to the arcades of the side aisles and the galleries, the upper windows themselves are better enclosed by the nearer group of little shafts supporting the vaults, and do not appear to stand in empty space. The apse of the cathedral of Paris as Maurice of Sully left it in 1196, was certainly happier in proportion than the parallel bays of the choir or nave, but this was yet only an experiment and not yet a successful and complete work, at least in the interior. A structure less vast but better c conceived had been commenced in the same epoch at Soissons by bishop Nivelon de Cherisy in 1175; we will speak of the south transept of the cathedral, whose choir and nave were rebuilt or finished at the beginniug of the 13 th century. This tran-

as in the porch of Vezelay. We shall again find these arrangements in some northern churches, for example at the abbey aux Hommes of caen, where the triforium is covered by an abutting tunnel vault, that is more than a quarter cylinder.(Art. Arc-Boutant, Fig. 49). In the royal domain at the end of the 12 th century, however little importance the churches had, above the side aisle was a gallery with pointed vaults, a longitudinal gallery that allowed on solemn days the admission of a great multitude of believers within the churches; for by this means the area of the side aisles was doubled. But we have shown how that arrangement induced the architects, either to raise the central nave and the proportion, to sacrifice the upper windows or make them very small. Most of the great churches of the royal domain and of Champagne, built during the reign of Philip August, possess a vaulted gallery over the side aisle; we shall cite the cathedral of Paris, the churches of Mantes and of S. Germer, the cathedrals of Noyon and of Laon, the choir of S. Remy of Rheims, the south thansept of the cathedral of Soissons, etc. These galleries in the second story allow a solid wall to appear in the nave between their vaults and the sills of the upper windows, against which abut the shed roofs that cover them as at Notre Dame of Paris and at Mantes; or indeed are surmounted by a triforium pierced in the part adjacent to the roof and lighting it, as at Laon, S Soissons and Noyon. The architect of the cathedral of Paris, commenced in 1168, undertook a great task for his time, that of erecting a nave of 36 ft. span between piers with doubled side aisles and vaulted galleries. Here is how he solved the problem. (27). He gave the side aisles but a moderate height; the windows of the outer side aisle could then scarcely light the two side aisles A and B. The gallery constructed over the side aisle B was covered by rampant cross vaults, so as to o open wide and high windows in the outer wall from C to D. The opening E thus allowed these windows to light the principal aisle, the direction of the light being as the dotted line D F. A roof sufficiently flat to not be obliged to raise the sills of the upper windows too much, covered the vaults of the gallery, the wall G H remained solid, and the upper windows could light only the great vaults. Very probably flying buttresses of two spans then abutted these great vaults. On the exterior

in height the least possible space in the combination of the vaults, while arranging upper very large windows intended to light directly the middle of the nave. Fifty years were required for architects at the end of the 12 th century to arrive at this great result from the still Romanesque vaults of Autun and Vezelay; and from that moment all constructions of religious edifices depend on the arrangement of the vaults, the f forms and dimensions of the piers, their spacing, the openings of windows, their width and height, the position and projection of the buttresses, the importance of their pinnacles, the strength, number and curvature of the flying buttresses, the collection and removal of rainwater, the systems of covering, all proceeds from the combination of the vaults. The vaults determine the stone skeleton of the monument to the point, t that it is impossible to erect it, unless one commences by d drawing them accurately before setting the first courses of the structure. This rule is so well established, that if we see a church of the middle of the 13 th century demolished to the level of the base, so that there remains only the plan, we can unerringly trace the vaults, indicate the direction a and thickness of all the arches. At the end of the 14 th century the rigor of the system is even more absolute; by examining the base of an edifice one can trace not only the number and direction of the arches of the vaults and recall their s strength, but even the number of their mouldings and also their sections. In the 15 th century, these arches of vaults t themselves extend down to the ground, and the piers are only vertical bundles composed of all the members of these arches. After it one asks why serious men can still reject the study of the architecture of the middle ages, as being only the result of chance?

It is necessary to return on our steps, now that we have b briefly traced the history of the vault, from the simple round tunnel vault and the dome to the pointed vault. We have seen how in the churches od Auvergne, of a part of central France, of Burgundy and Champagne, from the 10 th to the 12 centuries the side aisles had above them frequently a vaulted gallery, either with a half tunnel vault as at S. Etienne of Nevers, at Notre Dame du Port of Clermont, by tunnel vaults perpendicular to the nave as at S. Remy of Rheims, or by cross vaults

three inconveniences; the first being the marking of windows by the projection of the diagonal arches A F, B E; the second the unequal transfer of thrusts to the piers, for the points A B, E F receive the springings of the transverse and diagonal arches, are much more heavily loaded and thrust outwards than the points C and D, that only receive the springings of a single arch. Indeed under the points -, B, E, F were placed three little columns to support the three springings, and a single one under the points C and D; but the lower piers A, B, C, D, E, F and the external flying buttresses are of equal strength and resistance; the third is being compelled to raise the eave walls much above the windows, if it be desired t that the tie-beams of the carpentry may pars freely above the vaults, for the groin arches A F, B E are diagonals of a square and semicircular, necessarily raising the crown G to a he-height equal to the radius G B; while the transverse arches A B, E F, although pointed only raise their crowns to a level below that of the crown G; further the triangles A G B, E G F are too great; to give stability to their compartments, it is necessary for their ridge lines G H to be much curved, hence the points I still rise more than 3.3 ft. above the crown H. For these vaults to be stable, must they be much swelled and have great height; and we have just stated, that the constructors sought to reduce these heights. Then toward the beginning of the 13 th century was definitely renounced this system of vaults, and pointed arches were turned in each bay of the nave, as indicated by the Fig. (25). As a rerult of this new method, the piers A, B, C, D had equal thrusts and loads, the windows opened below the side arches A B, C D were uncovered; the crown G was only raised to a height equal to a radius A G above the springings of the arches. the triangles A B G, C D G being smaller, could be filled without being obciged to give much rise to the lines G H through the crowns. It was then easy to keep the crowns of the side arches and the crowns G, H at the same level, and consequently to place the carpentry immediately above the high windows, considering only the depths of the crowns of the side arches and of the vault, a depth externally filled by the height of the courses of the coruice. The cross section given here (26) on I K shows how the constructors had succeeded after the first years of the 13 th century in losing

Dame of Paris; if it be desired to erect over the side aisles next the nave a vaulted triforium, to cover this triforium by carpentry; if it be also desired to pierce windows above these roofs beneath the side arches of the great vaults, one will be compelled to give a great height to the central nave. Thus in analyziug the cross section of the cathedral of Paris, we shall be struck by the low proportions of each story of the construction to avoid giving the nave too great height in comparison to its width. The side aisles are crushed, the gallery is low, the original upper windows are extremely short, and by means of these sacrifices it occurs that the central nave of the cathedral of Paris has beneath its crown a little less than three times its width (27); for it is necessary to observe, that this width of the central nave cannot exceed a certain limit because of the slenderness of the supports, and of the mode of construction of the vaults maintained only by a law of equilibrium; the widest naves known are no more than 54.5 ft. between axes of the piers. This requirement of not raising the vaults to too great heights in order to maintain them, contributes more than all else to reduce the architects at the end of the 12 th century in the northern provinces, to seek and find a system of vaults with crowns no rising above the level of the tops of the upper windows. But as already s stated, they were embarrassed when it was necessary to place the vaults on rectangular bays, even with pointed arches. The ancient method adopted in the Roman cross vault, in projection being a square divided by two diagonals into four equal triangles, could not be abruptly set aside;. This form continued in the mode of drawiug, for it is necessary to have practised the art of construction in order to know why a geometrical f figure was transmitted by the traditions of the empire, and what efforts of mind were necessary for a practical man to s suppress and replace it by another. Thus men continued to draw new vaults with pointed arches on a square plan formed by a pair of bays.(24). The transverse arches A B, E F being pointed, the diagonal or groin arches semicircular. The arch C D was also pointed like the transverse arches, but frequently more pointed. The crows of the arches A C, C E, B D, E F reached the level of the crown G, the windows being opened beneath the side arches; this method of constructing the vaults had

things, to give a great height to the middle aisles in comparison to their width. Most authors that have written on the r religious architecture of the middle ages are astonished by the prodigious height of these naves, and they have desired to find a symbolic idea in that height. That at the end of t the 13 th century and during the 14 th and 15 th centuries, the height of religious edifices may have been exaggerated, independently of the requirements of construction, we are willing to admit; but at the moment when religious architecture developed in the North of France, when one scrupulously studies the monuments, he is struck by the efforts made by the architects on the contrary, to reduce ar much as possible the height of the naves. A very simple explanation will illustrate what we advance here. Assume for an instant, that we have to construct a church according to the methods accepted at the end of the 12 th century. (23). The nave must have 39.4 ft. b between axes of piers,,the side aisles 23 ft.; so that the s side aisles may have a suitable proportion in height, .nd can introduce light enough to illuminate the middle of the nave, they must have a height not less than 39.4 ft. to the crown of the vaults. It is necessary to cover the side aisles by a roof with 16.4 ft. rise including thickness of vault, so that we reach the upper edge of the roof or side aisle at 55.8 ft. Add thereto the belt abowe these roofs and the sills of the windows, altogether 3.3 ft., then the height of the upper windows, that cannot be less than twice the distance between piers to obtain a suitable proportion; now the side aisles being 23 ft. wide, the space betueen the piers of the nave will be 18 ft., which will give the windows a height of 36 ft. Then add 1.3 ft. for depth of the crown of these windows, 1 ft. for depth of side arch, 0.8 ft. for thickness of the vault, 2.0 ft. for wall to raise the roof, and restricting ourselves to the most moderate heights, we have attained a height of 105. ft. at the base of the great roof and of 98.4 ft. under the crown of the vault. The span of the nave between the piers being 33.4 ft., it will be found in height to be about three times its width. Now it is rare that a nave of the end of the 12 th century is of such high proportions in a monument with single side aisles and without vaulted triforium. But if it be required to erect a cathedral with doubled side aisles like Notre

tunnel form; evidently the constructors in that epoch, while recognizing that the continuous thrust of the tunnel vault w was unsuited to edifices, whose plans gave only a few distant points of support, that it was necessary to divide this thrust by means of side arches with vaults intersecting the primitive vault, they dared not frankly adopt the system of pointed vaults; besides they commenced scarcely about the middle of the 12 th century to place projecting pointed arches, and the groins of the vaults not being supported without this assistance, except by a very complex jointing, for which masonry of small rubble was unsuited. The oldest pointed arches are merely projecting ribs, rounds, single, double or triple, which are evidently placed beneath the groins of the vaults at first to d decorate and give a less cold and dry appearauce to the construction. For example, in the porch at Vezelay, only two vaults have pointed arches; they are merely a decoration and add nothing to the stability of the vaults, that are not combined to need their aid. The great vaults, almost domes, of the cathedrals of Angers and of Poitiers are decorated by very thin pointed arches, useless and which instead of supporting the compartments, are borne by them by means of tails entering t the scarcely projecting groins of these vaults. But soon during the second half of the 12 th century, the northern architects took possession of this decorative motive to establish their entire system of construction of vaults with pointed a arches. They gave to the pointed arches a thickness and strength great enough, not only to maintain them by the jointing of their voussoirs, but again to serve as centerings on which could be turned the triangular compartments forming as many little vaults independent of each other, and transferring their entire weight to these centerings. This principle once a adopted, these architects completely mastered the thrusts of the vaults, making their springings and direction at resistant points. By the skilful application of this principle they quickly came to transfer the entire weight and thrust of the enormous vaults to extremely slender piers, with a very small area in horizontal projection. We shall not enlarge on this further in this chapter, developed under the Art. Voute.

Fig. 19. shows how the architects who erected the churches were led, almost in spite of themselves and by the force of

And this porch, in which the transverse arches are equilateral pointed, presents cross vaults with and without diagonal arches, very skilfully constructed and clearly abutted by the rampant cross vaults of the upper galleries, as indicated by the cross section of the porch (22). But here as in the churches of Auvergne, the principal nave does not receive direct light; to have the light it would have been necessary to raise the middle vault to the point A; then the windows could have been pierced above the roof of the triforium in the wall B, a series of small arches, or a second triforium would have lighted these roofs at E, and to abut the great vault it would have sufficed to construct at each transverse arch a flying buttress C to transfer the thrusts to the buttresses D, made more resistant by a greater projection. This last step was easy to take; thus we see nearly all the religious edifices of the r royal domain, of Champagne, Burgundy and Bourbonnais, adobt this method, not without some experiments, during the second half of the 12 th century. But in rejecting tunnel vaults in the provinces of the North, and replacing them by cross vaults (even when they were combined like those of the pormh of the church of Vezelay, i.e., very little elevated), one must at t the same time renounce coverings placed directly on these vaults, and carpentry became necessary. A new difficulty presented itself. Vaults constructed after the system adopted in t the porch of Vezelay either required carpentry without tie-beams, if the walls supporting eaves rose to the point E, i.e., to the height of the crown of the side arches, or even an extra height of these eave walls to the crown G of the great v vaults, if it were desired for the trusses to have tie-beams. Now we see that to obtain direct light above the triforium at B, men were already compelled to give a great height to the walls of the nave; it was then important to gain all height possible; then men were induced to lower the crowns of the t transverse arches of the great vaults to the level of the crowns of the side arches, and as a result the springings of t these transverse arches must be placed below the springings o of the side arches. (Art. Voute). After many hesitations, about 1220 the crowns of the transverse and side arches definitely attained the same level. The great vaults of the nave of the porch of Vezelay had trouble in abandoning the primitive vault

cross vaults ower the principal nave as well as on the side aisles; only to bring the intersection of the compartments of the vaults according to the round side arches and up to the crown of the great round tunnel vault of the nave, they had recourse to experiments very interesting to study. (Art. Voute). Here is a perspective view of this nave looking toward the entrance, that gives the idea of the system adopted (21), and do not forget that this nave was erected at the beginning of the 12 th century, a short time after that of Cluny, consequently the effect was considerable and the progress quite m marked, since the nave of Cluny still had a round tunnel vault, and that even after the construction of the nave of Vezelay about 1150, tunnel vaults (indeed pointed) were still built over the great naves at Autun, Beaune and Saulieu, as indicated in Fig. 20. But the innovation tried at Vezelay did not have brilliant results, for if these vaults transmitted their thrust to isolated piers, these were only stayed by buttresses of small projection, and they pressed the walls outward and deformed the vaults of the side aisles; and after some of them had fallen and all had become depressed, it was necessary to construct at the end of the 12 th century flying buttresses to arrest the effect of that thrust. At Cluny, Beaune and the cathedral of Autun, it was even necessary to place flying buttresses against the walls of the nave during the 12 th and 13 th centuries to stop the spreading of the vaults.

It is certain that the effects manifested in the nave of Vezelay must surprise the constructors, who believed that they had provided against the spreading of the great cross vaults, not only by establishing external buttresses, but with much more certainty by placing iron tie-rods fixed above the capitals at the springings of the transverse arches, by strong p pins fixed in the wooden timbers extending lengthwise in the thickness of the walls. (Arts. chainage, Construction, Tirant). These tie-rods fulfilled the function of a chord at the base of the transverse arch, but cracked or broke their pins; for at that epoch iron rods of great length must be very irregular and badly forged. But this experience was not lost. In the same church of Vezelay about 1160, a closed porch was built, an actual narthex or antechurch, according to the custom then adopted by the rule of Cluny (Art. Architecture Monastique).

century, A are the side aisles and B the principal nave; the areas C D E F are square and can easily be vaulted by two half cylinders of equal diameters, but the areas G H I K are parallelograms; if a tunnel vault or half cylinder be turned from G to H, the half cylinder G I will intersect the half cylinder G H below its crown as indicated by the Fig. (17). The centering for this sort of vaults must appear difficult to inexperienced constructors; further these vaults termed cloister arches are heavy, disagreeable in appearance, especially if very wide, as one may be convinced by examining the Fig.(18). The northern builders of the 11 th century did not even attempt t to employ them; they contented themselves by covering the side aisles by Roman cross vaults and by continuing to cover the nave by visible carpentry, as the Fig. (13) indicates, or they had the idea of erecting tunnel vaults over the walls of the nave above the upper windows. This second method (19) could not be durable; the great vaults A were not abutted and must fall soon after their centering was removed; external buttresses were placed at B, but these buttresses could not resist the continuous thrust of the tunnel vault only at certain isolated points, since they overhung the haunches of the transverse arches C, deforming them and dislocating thus the entire construction. To diminish the thrust of the vaults, men had the idea about the beginning of the 12 th century in some localities to use for their section a broken or pointed curve, reinforcing them (as in the nave of the cathedral of Autun) by projecting transverse arches between the piers, maintained by buttresses. (20). There was an improvement, but this method was no less vicious; most churches built on that principle have fallen, unless they were strengthened by flying buttresses about a century after their erection. Then the Cluniacs rebuilt most of their establishments; from 1089 to about 1140 the great church of Cluny and the nave of the abbey of Vezelay were erected; we shall occupy ourselves more particularly with this last religious monument, still standing today, although a street and gardens have replaced the admirable edifice of S. Hugues and of Peter the Venerable (Art. Architecture Monastique).

At Vezelay religious architecture made a great advance; without abandoning the round arch, the constructors established

carpentry, or to vault them and deprive them of direct light.

All these monuments were in conditions of stability, such that they have come to us nearly intact. These types were continued during the 11 th and 12 th centuries with scarcely sensible variations in the centre of France, in the south, west, aud even in Burgundy. In Ile-de-France, Champagne, Picardy, a part of Burgundy and in Normandy, the procedures for constructing religious edifices took a different direction. These provinces contained important and populous cities; it was necessary for the religious edifices to be able to contain a great number of believers, the antique basilica, ventilated, light, allowing the construction of wide naves separated from the s side aisles by two rows of slender columns, satisfied this pr programme. Indeed if we examine (15) the section of a basilica built according to Roman tradition, we see a nave A or principal aisle, that may be 33 to 40 ft. wide; if we subordinate that width to the ordinary length of timber forming the tie-beams; two side aisles of 16 to 20 ft. width, lighted by windows G; above are two galleries C permitting a view of the sanctuary, themselves lighted by direct light, then to light the carpentry and the interior of the nave upper windows E are pierced above the hoofs of the galleries. This structure could be erected on a vast plan at little cost. But as we have stated, for these peoples were required more durable edifices, with au appearance more monumental and more contemplative; b besides at the end of the 10 th century the Normans had left few eidifces standing in the provinces of the north of France. From the 11 th century men thought of rebuilding the religious edifices on new systems, capable of resisting all causes of ruin. The system of the Roman cross vault formed by the intersection of two half cylinders of equal diameters had never been abandoned; so it was applied to religious edifices from the time that visible carpentry was rejected; but this system could only be emploved for vaulting a square bay; now in the plan of a Latin basilica, the side aisles alone present square plans for each bay; as for the nave, the space comprised between two piers being less than the width of the principal aisle, the area to be vaulted is found to be a parallelogram, and cannot be covered by a Roman cross vault; for example, (16) taking a portion of the plan of a church of the 11 th

dates from the end of the 11 th century, and still retains its carpentry concealed by a tunnel vault of boards made a few y years since; the church Notre Dame at Mans of the same epoch, which at its origin only had vaulted side aisles; the great abbey church of Trinite and that of S. Etienne at Caen, whose naves were certainly covered at first by visible carpentry, e etc. At S. Remy of Rheims exists an upper gallery as wide as the side aisle, that was also probably vaulted in the same ma manner. We have assumed in Fig.(13) that the carpentry of the side aisles is removed, so as to show the tunnel vaults of t these side aisles.

Men did not delay in some provinces to profit by the last system for abutting the vaults, which soon replaced the carpentry of the principal naves. In the Romanesque portion of the nave of the cathedral of Limoges, in the churches of Chatillon-sur-Seine, and of the abbey of Fontenay near Montbard of the order of Citeaux, may be seen the vaulted side aisles covered by a series of parallel tunnel vaults perpendicular to the nave and resting on transverse arches; the bays of these naves are wide; the continuous thrust of the great upper tunnel vault is abutted by the crowns of the tunnel vaults of the side aisles, and by the walls built on the transverse arches supporting these tunnel vaults; walls that are actual abutments, rometimes even relieved by arches and serving at the same time as supports for the purlins of the lower roofs; the example (14) given here illustrates the entire skeleton of t this construction; A are transverse arches of the side aisles supporting the tunnel vaults perpendicular to the nave, as we well as walls carrying purlins and abutments B, lightened by discharging arches, actual flying buttresses concealed beneath the roofs. In these religious edifices the upper carpentry is suppressed, the tiles simply covering the pointed tunnel vault C. As for the carpentry of the side aisles, it is reduced to layers of purlins and rafters equally supporting concave tiles or great flat tiles, most frequently glazed (Art. Couverture). But the great naves of these churches could not be lighted by direct light, and they were dark in their upper parts, so that men always found themselves between two inconveniences, either to light the naves by windows opened above the vaults of the side aisles, and then covering these naves by visible carpen-

the carpentry to receive the covering of tiles, slates or lead. Coverings set directly on the masonry vaults caused frequent injuries in damp climates, allowing rain to soak into the interior, or even by porosity of the materials employed, stone slabs or terra cotta. If the northern constructors employed t that procedure, when they commenced to vault their churches, they must have abandoned it soon on recognizing the inconveniences just mentioned, and they protected their vaults by carpentry, that permitted examination of the upper surfaces of these vaults, and that allowed dry air to circulate above them and made repairs easy. We shall soon see how this necessity contributed to make them adopt a combination of special vaults. The attempts to erect vaulted churches was not limited to those indicated above. Already from the 10 th century architects had the idea of vaulting the side aisles of Latin basilicas by means of a series of round tunnel vaults resting on transverse arches and perpendicular to the walls of the nave; the great nave continued to be covered by carpentry. The remains of the primitive basilica of the abbey of S. Front of Perigueux retains a construction of this kind, which existed in a very developed form in the abbey church S. Remy of Rheims before t the modifications made in that curious monument during the 1 12 th and 13 th centuries. The Figure (13) will illustrate t this kind of structures. These parallel tunnel vaults resting on transverse arches, whose springings were not very high from the ground, could not thrust toward the interior the piers of the nave loaded by the higher walls; and windows taking direct light were opened above the side aisles. On the upper Marne, on the banks of the upper Saone, in Normandy, there must have existed in the 11 th century many churches erected on this s system, either with tunnel vaults perpendicular to the nave or with cross vaults over the side aisles; the naves remained covered only by carpentry. Most of these edifices were modified in the 13 th century, i.e., by constructing high vaults on the walls of the nave and abutting them by flying buttresses; but one easily finds traces of these primitive arrangements. Some religious edifices built by the Normans in England have retained their carpentry over the great naves, only the side aisles being vaulted. We will cite among French churches the little church S. Jean of Chalons-sur-Marne, whose nave

triforium the windows, that light the central nave of the Roman edifices. The necessity of supporting the tunnel vault by a continuous abutment in the form of a half tunnel vault over the galleries forbids the construction of opening windows introducing light directly below the central vault. The naves of these churches are lighted only by the windows of the side aisles, or by windows opened at the bottom of the triforium; they are dark and cannot be adapted to countries, where the sun is often concealed or the sky is darkened.

In Poitou, in a portion of the western provinces and in some localities in the south was adopted in the 11 th century a d different mode of constructing and vaulting churches; the side aisles were raised to the height of the nave, and small cross or tunnel vaults erected over the side aisles abutted the central tunnel vault. The abbey church of S. Savin near Poitiers, whose plan we give (11) is built after that system; long cylindrical columns bear the archivolts on which rest the central round tunnel vault of the nave and the little cross vaults of the two side aisles, as indicated by the cross section (12). But here the lateral gallery of the Latin basilica is suppressed, and the nave is only lighted by windows opened in the wa walls of the side aisles. For small and narrow churches this system is not inconvenient; yet it leaves the middle of the monument and especially the vaults in darkness when the nave is wide; neither would it suit the great churches of the north. It will be noticed, that in edifices, either in Auvergne or t the south of France, according to the mode of side aisles with or without galleries abutting the central vault, the vaults entirely replace the carpentry, since they not only cover the nave and side aisles, but they bear the covering of tiles or stone slabs. This fact is remarkable; recognizing the inconveniences of carpentry, these provincial architects suppressed it entirely, and thus eliminated all the causes of destruction by fire. In the provinces of the north, in Normandy, Ile-de-France, Champagne, Burgundy and Picardy, when it was decided to vault the Latin basilica, nearly always was left the carpentry above the vaults; the two methods were combined, the v vault for better covering the edifice, and to give a more dignified and more monumental appearance to the interiors, to p prevent the carpentry in case of fire from calcining the nave;

ceiled beneath in the last century (18 th), but some of its trusses were still intact.

Note 1. p. 170. L'Architecture Byzantine en France, by M. F. de Verneilh. Paris. 1852.

Note 1. p. 172. The study of these important edifices was carried very far by F. de Verneilh in the work just cited; we can only refer our readers to it. Plates, very well executed by Garderel, illustrate the text in the clearest manner.

In Auvergne as a centre, and following the Loire toward Nevers, another system is adopted in the construction of religious edifices. In these countries from the 11 th century carpentry was rejected for covering the naves; the side aisles of the Latin basilica were then retained as well as the upper ga gallery. The central aisle was covered by a round tunnel vault, with or without transverse arches, half tunnel vaults like c continuous flying buttresses were erected over the upper galleries to abut the central vault, and the side aisles were vaulted by the intersection of two half cylinders after the Roman fashion. A dome terminates the sanctuary as in the antique basilica, and the middle of the transverse aisle was covered by a dome with accented surfaces or rounded at the angles, borne by trumpets or concentric arches, or even sometimes by simple corbellings supported by corbels. This system of construction of religious edifices is continued during the 12 th century, and we see it adopted as far as Toulouse in the great church of S. Sernin. Here is the plan of the church of the priory of S. Etienne of Nevers (8), built during the second half of the 11 th century, which presents one of the most complete types of churches with nave having round tunnel vaults abutted by half tunnel vaults turned over the galleries of t the side aisles. (9). The plan of the church Notre Dame du P port at Clermont-Ferrand is a little later; (10) the cross s section of the nave of that church, and (10 bis) the section through the transepts, in which appears the central dome, also abutted by half tunnel vaults resting on two walls with openings borne on two transverse arches constructed in the extensions of the external walls. In these edifices all the thrusts of the vaults are perfectly resisted; thus they are preserved intact until now. Yet in being inspired by the Roman basilica, these churches do not retain above the upper gallery or trif-

astride the bays of the ancient nave. The church S. Front then found itself possessing a front porch, (the primitive narthex), a second vaulted porch, the vestibule beneath the tower, and finally the principal body of the structure, covered by five domes placed on wide transverse arches and pendentives (5). Here the domes and transverse arches are not drawn as at S. Mark of Venice forming a semicircular curve, but they show p pointed arches, although in France the equilateral arch was not yet adopted; but the builders of S. Front were not familiar with this system of vaults, and they certainly sought the pointed arch for obtaining greater resistance and a smaller thrust. (Arts. Construction, Coupole). This importation of t the dome on pendentives is only applied to church S. Front a and to that of the city of Perigueux. During the 11 th and 1 12 th centuries a great number of churches with domes was erected in Aquitaine; the churches of Souliac, Cahors, Angouleme, Tremolac, S. Avit-Senieur, Salignac, S. Emilion, S. Hilaire of Poitiers, Fontevrault, Puy-en-Velay, and many others still p possess domes raised on pendentives. But church S. Front alone presents a plan copied from that of S. Mark. The other edifices just cited retain the Latin plan with or without transepts and are nearly always without side aisles. We give here t the plan of the beautiful abbey church of Fontevrault (6), w which dates from the 12 th century, and that possesses a series of four domes on pendentives in its nave, arranged and abutted like those of the cathedral of Angouleme with much art. Here (7) is one of the bays of the church of Fontevrault. Until the 12 th century the influence of the dome made itself f felt in the religious edifices of Aquitaine, Poitou and Anjou; the cathedral of Angers, built at the beginning of the 13 th century, is without side aisles, and although its vaults have pointed arches, their sections show true domes.(Art. Voute). The naves of the cathedrals of Poitiers and of Mans are still subject to this influence of the dome, but in these edifices the pendentives disappear, and the dome is mixed with the pointed vault of the monuments of Ile-de-France and the North.[1]

Note 1. p. 169. This curious edifice, the most complete of that date known to us, was discovered by M. Merimee, inspector general of historical monuments, and was recently restored with great intelligence by M. Boeswillwald. The carpentry had been

construct the vaults in the other parts of religious edifices in which that kind of construction presented great difficulties. We give (2) the plan of the little church of Vignory, w which already contains a side aisle with apsidal chapels extending around the sanctuary. This side aisle B is covered by an annular vault; four other separate tunnel vaults are separated by transverse arches and flank the two buildings replacing t the transepts before the apse. The sanctuary C has a half dome, and two transverse arches D D abut the side aisles A A on which were erected two bell towers; one alone remains, rebuilt in great part in the 11 th century. The entire remainder of the edifice is covered by carpentry, visible and dressed. [1] The cross section of the nave also given (3) illustrates this interesting construction in which appears the vault mixed with the primitive system of covering in wood. It will be noted t that the nave presents a suggestion of a gallery, that still recalls the gallery of the first story of the Roman basilica; it is no more than a decoration at Vignory, useless and apparently a concession to tradition. But soon men were no longer satisfied to vault only the choir, the apsidal chapels and t their accessories, but desired to replace everywhere the combustible carpentry by vaults in cut stone, rubble or bricks; this carpentry burned or decayed rapidly; although painted, i it did not present that monumental and durable appearance, t that mediaeval constructors strove to give to the church. The different countries that from the 13 th century composed France did not proceed in the same manner to vault the Latin basilica. In the West at Perigueux, from the end of the 10 th century onward was erected the cathedral and the great abbey church of S. Front (Art. Architecture, Development of) under the influence of the domed church of S. Mark at Venice. [1] This monument, of which we give the plan and cross section, succeeded a basilica built according to Roman tradition. It was an importation foreign to all that had been erected at that epoch on the western soil of Gaul after the invasion of the barbarians. The plan (4) reproduces not only the form but also the dimensions of that of S. Mark with few differences. The front part of the plan shows the remains of the ancient Latin basilica modified at the end of the 10 th century by the construction of a dome behind the narthex, and of a bell tower set

middle of which is reserved an open passage separating men a and women. P is the tribune, the pulpit and later the rood s screen, where were read the epistles and evangelists. A is t the lower choir in which remained the clerics. O is the entrance to the shrine, the crypt that encloses the tomb of the saint to whom the church is erected; at both sides are steps for ascending to the sanctuary. C is the principal altar. B is the apse, in its niche being the throne of the bishop, abbot or prior; the stalls of the canons or ecclesiastics extended more or less at the right and left. E are the extremities of the transepts. D are secondary altars. F is the sacristy, commencing with the cloister L and the dependencies. Sometimes from the porch the cloister was entered by a passage and a p porter's door K. Then the bells were nearly always placed, n not at the front of the church, but near the transept at M on the last bays of the side aisles. The ecclesiastics thus found themselves near the service of the bells, for the offices at night, or were not obliged to pass through the multitude of believers to ring the bells during the mass. The abbey S. Germain des Pres at the end of the last (18 th) century s still had its two towers so placed. Cluny, Vezelay and many o other churches of abbeys and priories, even of parishes, and a great number of cathedrals had bell towers arranged in that manner. Chalons-sur-Marne still shows the lower stories of i its two towers built at the sides of the choir. Abbe Lebeuf i in his History of the diocese of Auxerre, reports that in 1215, bishop William de Seignelay, caused the rebuilding of the choir of the cathedral of S. Etienne, that we still admire today, the two Romanesque towers that had not been torn down, but had been undermined at their bases to allow the execution of the new works, fell on each other without breaking the rood screen, which was regarded as a miracle. [1]

Note 1. p. 162. Mem. concer. l'hist. civ. et eccles. d'Auxerre et de son ancien diocese, by Abbe Lebeuf. Pub. by Challe and Quantin. Vol. 1. p. 377. Paris. Didron. Auxerre. Perriquet. 1848.

At that epoch (we are speaking of the 10 th century), the apses and the lower stories of the bell towers were nearly all the vaulted parts; the naves, side aisles and transepts being covered by carpentry. Yet already efforts had been made to c

calling the believers and to warn them of the hours of prayer. The tribune of the antique basilica was not sufficiently large to contain the numerous clergy collected in the church, the c choir must infringe upon the portions left to the public in the Roman monument. The church was not isolated, but around it like the pagan temple were grouped buildings designed for the habitations of priests and clerics; porticos, sacristies, sometimes even schools, libraries, small halls to receive the treasures, charters, the sacred vessels and the priestly ornaments, cells for penitents or those benefited by the right of asylum. A wall nearly always enclosed the church and its appendages, the cemetery and gardens; that wall was closed at night by fortified gates. A great number of churches were served by a regular clergy dependent on abbeys or priories, thus being attached to the entirety of these great establishments. collegiate churches, parish churches and the chapels themselves possessed in a more restricted proportion all services n necessary for the worship, little cloisters, sacristies, treasuries, and lodgings for the servants. Besides collegiate churches, parish churches and chapels being placed under the j jurisdiction of the bishops, the abbeys and priories also exercised rights over them, and sometimes even lay nobles erected chapels, changed parish into collegiate churches without consulting the bishops, which frequently gave rise to lively disputes between these nobles and the bishops. The cathedrals comprised in their dependencies the buildings for the chapter, vast cloisters, the bishop's palace, halls for synods, etc. (Arts. Eveche, Salle Synodale, Cloitre, Architecture Monastique, Tresor, Sacristie, Salle Capitulaire).

To make known the general arrangement of a church of average size in the 10 th century, we give (1) here a plan summarizing these arrangements, without being copied from any existing e edifice. I is the portico preceding the nave, the narthex of the primitive basilica, beneath which staid the penitents temporarily forbidden entrance to the church, and the pilgrim a arriving before the opening of the doors. From this porch, g generally covered by a shed roof, men entered the nave and s side aisles by three doors closed by cloths during the day. N is the baptismal font, either placed in the centre of the nave or in one of the side aisles H. G is the nave in the mid-

architecture in France. It continues during the 16 th century undecided, retaining and rejecting in turn its traditions, h having neither the courage to break with the forms and system of construction of preceding centuries, nor the means of preserving them. (Art. Architecture Religieuse). Monastic architecture was struck to the heart and stopped short. Civil architecture took a new flight during the entire duration of the 16 th century, and alone produced works truly original.(Art. Architecture Civile). As for military architecture, it is unnecessary to state that it was profoundly modified at the moment, when artillery changed the systems of attack and defense of fortified places.

Architecture Relegieuse. Religious Architecture.

Among all peoples religious architecture is that first developed. Not only in the midst of powerful civilizations, the religious most corresponds to the strongest moral need, but a again it is a place of asylum, of refuge, a protection against violence. In the temple or the church are preserved the archives of the nation, its most precious documents are under the guard of the divinity; under its shadow are held the great religious or secular assemblies, for in serious conditions, constituted societies have a need of approaching a superhuman p power to sanction their deliberations. This feeling is found among all nations, showing itself very pronounced in Christian society. The pagan temple is merely a sanctuary entered o only by the ministers of worship and the initiated, the people remaining outside its halls, so that where the monuments of a antiquity remain standing, they could not suit Christians. T The antique basilica with its great dimensions, its wings or side aisles, its front portico, lent itself to worship for t the new law. It is even probable that the arrangements of the Roman edifice may have had a certain influence on the custom adopted by the first Christians from the moment, when they l left the catacombs and practised their worship in public.
But within the limits in which we are kept, we shall take as a starting point the Christian basilica of the Carlovingian epoch, whose arrangements already differ from the antique basilica. Then were they contented with a single altar, and it was necessary to erct towers intended to receive the bells for

This great movement gradually effaced the light cast by the m monasteries in the preceding centuries. Abbeys were secularized, their moral influence was lost and many of them fell into lay hands. France was full of churches erected during the three preceding centuries, which sufficed and more for the needs of worship, and the reform lessened the number of believers. Rome and the entire Catholic clergy, from the beginning of t the 16 th century, did not understand the entire importance of the doctrines preached by the innovators. After such glorious contests, the Church definitely believed itself firmly f fixed on its divine base, and had not taken up arms soon enough; it went to the council of Trent to stop the advance of the conflagration, but it was already very late, and it was necessary to take part with the fire. A reform was necessary in itself, and the Church had itself solemnly recognized the council of the Lateran; it was overwhelmed by this prodigious intellectual activity of the 16 th century, by those new political tendencies of the people of Germany and of France; it was betrayed by its ancient enemy, feudalism, which in its turn was carried away by the storm, that it had raised against the Church. The original native and individual spirit of the people was exhausted in these terrible struggles, that with us desolated the second half of the 16 th century, and royalty alone strongly established itself on the ruins. Louis XIV closed the Renaissance. As always, the arts were associated with these great political movements. Until Louis XIV it is a rapid and fertilizing river, varied in its course, flowing along in a bed, sometimes wide and sometimes restricted, receiving all the sources, interesting to follow in its windings; under Louis XIV, this river becomes a vast lake of stagnant water, infertile and with uniform reflections, astonishing by its grandeur, but that takes us nowhere and wearies the eye by the m monotony of its appearance. Today the dykes are broken, and the water escapes everywhere in disorder through a hundred op openings; where do they go? No one knows.

Note 1. p. 165. Essai sur l'histoire du tiers etat. M. A. Thierry. Vol. 1. p. 118. edit. Furne. 1853:-- Recueil des anciens lois francoise. M. Isombert. Vols. 11, 12, edit. Villers-Cotterets. 1539.

With the Renaissance stops the development of Religious ar-

to commence the elegant structures of Pierre Lescot. Francis I sold his mansion S. Paul, "very dark and ruinous, in which we are not accustomed to reside, because we have in our good city several other good lodgings and luxurious places, and t that the said mansion is of little value to us and to our domain." [1] Civil architecture invaded feudal architecture, in which until then all was almost entirely sacrificed to arrangements for defense; and king Francis I thus accomplished by means of the arts, leading his nobility in this new path, the great political revolution began by Louis XI. The feudal nobles submitted to the empire of fashion, themselves demolished their fortresses, lavished their treasures in changing their gloomy castles into pleasant mansions, adopted the novelties preached by the reformers, not seeing that the people applauded their love for the arts, which destroyed their feudal hosts, not following them in their ideas of religious reform, that royalty allowed them to do this, and that on a given day kings and people, profiting by that impudent impulse, would come to tear from them the last vestiges of their power.

Note 1; p. 184. Alienation of mansion S. Paul. 1516. Histoire de ville de Paris. p.574. D. Felibien.

The study of letters and arts, which had until then been e exclusively cultivated by the clergy and the common people, p penetrated the aristocratic class, and thus brings a new element to the fusion of the different classes in the country. In spite of administrative disorder, the faults and misfortunes that characterized the beginning of the 16 th century in France, the country was in the way of prosperity, commerce, industry, sciences and arts took a vast development; it seemed that France had unknown treasures, that filled all the breaches in its credit made by cruel reverses and scandalous wastes. The cities burst their enclosures on all sides to extend themselves, they rebuilt on larger plans city halls, markets and hospitals; bridges were thrown over rivers; new roads were made; agriculture had before been one of the most powerful means of influence employed by religious establishments, and it began to be studied and practised by great land-owners belonging to the common people, it became "the object of legislation, some of which is yet in force." [1] The State established guards of waters and forests, for the working of mines.

tame the traditional spirit of the guilds of artizans; we have seen (Art. Architecte) how at the end of the 15 th century the power of these guilds had absorbed the unity of direction, and how the architect had gradually disappeared under the separate influence of each guild acting directly. Italy, France, especially Rome, had anformed our artists, where this only by the presence in France of the men brought by Charles VIII, a and to whom he desired to entrust the direction of the works, that these marvels so much admired beyond the Alps, were not due to trade guilds acting separately, but to isolated artists, architects, sometimes at the same time sculptors and painters, subjecting the workmen to unity of direction. Men were seen to arise in France under the reign of Francis I, who in imitation of the Italian masters and by the will of the court and the great nobles, imposed their projects on the guilds a and had them executed without their interfeeence, except as workmen. And among these artists, who learned from Italy to elevate their profession, who were inspired by its genius and by the antique arts so well renewed by it, many joined the p party of reform, which placed Rome under the ban of Europe! Who designated Leo X as antichrist, that man of such elevated tastes, such an enlightened protector of artists!

But it must be stated that in France the reform at its beginning was not hostile to the arts of relief, as in Germany; it broke no images, burned no paintings and manuscripts enriched by pictures; on the contrary being almost exclusively a accepted by the nobles and the higher class of the common people, it made no proselytes in the lower classes except in certain western provinces, and in those countries in whilh already in the 12 th century the Albigenses had originated a heresy opposed to the Catholic Church. The aristocaacy was better educated than it had ever been, literary, was passionately d devoted to the study of antiquity, followed the movement started by king Francis I, displayed a luxury before unknown in the construction of its chateaus and city mansions. It dismantled the old feudal manors to erect open habitations, pleasant and ornamented by porticos, sculptures, marble statues. R Royalty gave an example by destroying the old Louvre of Philip August and Charles V. The great tower of the Louvre, on which depended all the fiefs of France, was not spared, razing it

the abbeys and monasteries, and takes possession of their resources and their treasures. Such examples were well calculated to seduce the Chatolic nobility; to escape the spiritual domination of the clergy, to take possession of the ecclesiastical temporal property was a bait, that could not fail to c carry secular feudalism toward the reform, then again fashion was mingled with in France; without ranging themselves under the banner of Luther or of Calvin, curiosity was aroused; these struggles against the power of the papacy, so strong at that time, attracted attention; as always in France, men in the enlightened class were disposed to protect new ideas without f foreseeing the consequences. Marguerite of Valois in her little court of Navarre gave an asylum to Calvin, to Le Fevre of Etaples, who were both at odds with the Sorbonne. Great ladies mocked the Catholic mass, had composed a mass with seven points, and strongly opposed confession. The Sorbonne was angered, and they allowed it to be so. The duchess of Etampes had it in her heart to bring king Francis to hear the reformers. Men dispute; eahc day arises a new preacher seeking to obtain favor by stating some singular extravagance; sane minds (and they are always in the minority) are saddened, seeing w what storsm are gathering behind these discussions in the salons; but it must be said, the agitation was in societw. The ancient theological studies, those serious and grave meditations of doctors of the 12 th and 13 th centuries had passed their time, and men desire something else; the study of law was then very advanced and protests against the feudal organism. Francis I founded in France chairs of Roman law in imitation of those of Bologna; he endowed a trilingual college of which Erasmus would have been director, had Charles V. not h have taken him from us. Men were enamored of antique literature. This was an irresistible movement like that, which in t the 12 th century had raised society from barbarism; but in the 16 th century was lacking a figure like S. Bernard to restrain, regulate and fertilize that agitation, which soon lost itself in blood and ruin.

But see what strange contradictions! How the century proceeds to adventure! We have spoken of the little success of the attempts of charles VIII to cause the arts of the Italian Renaissance to prevail in France; how his efforts were unable to

nature, he did not fall daily into the strongest contradictions, like his predecessor at Wittenberg; but proceeding step by step, a diplomatic theologian, he never retreated. Luther, unable to master the tempest, that he had unchained against society, impelled the German nobility to the massacre of thousands of peasants fanatically excited by a fool; Calvin pursued and denounced Servetus, and had him burned alive, because he was attacked in his vanity as a reformer. These are the t two men, who were to modify profoundly a great part of Catholic Europe, and who under pretext of freeing souls from the domination of the sacred throne, commenced by relying on the most intolerant despotism, most fatal to the development of the liberty of conscience, to the arts, which need free will to preserve their originality; and that remain infertile whenever arises a power, that gathers under its hand the temporal and spiritual. Catholicism could only sustain that war aroused against the dogma of the Church, only by opposing to the spirit of anarchy and intolerance an army united under a severe discipline. As a counterpoise to the principle of reform, S. Ignatius of Loyola raised and organized his militia, whose immense strength rests on absolute obedience in spirit and l letter. Thus is extinguished in the bosom of Catholicism this germ, animated by discussion, controversy, bold innovation, that had produced our great artists of the 12 th and 13 th centuries.

Printing suddenly gives a vast extension to these contests, that without it would never have passed the walls of Wittenberg. Due to this means of disseminating the new ideas from one end of Europe to the other among all classes of society, everyone becomes a doctor, discusses the Scriptures, interprets in his own way the mysteries of religion, each desires to form a church, and all that great movement ends in the loss of liberty of conscience, in confusions of spiritual and temporal under a single despotism. Henry VIII, a royal theologian, first understands the political importance of the reform, and after refuting the doctrines of Luther, not being able to obtain from the Pope the severance of his marriage with Catherine of Arragon, he suddenly adopts the principles of the reformer, weds Anne Boleyn, confiscater for his own benefit the sfiritual power of England, at the same time that he suppresses

des Ouvr.et des Doctr. de luther, by M. Audin, Paris.

Luther desired imigas to be retained; one of his disciples, Carlstadt, almost under his eyes broke the statues and the stained glass windows of the church of All Saints of Wittenberg. Germany was covered by ruins, the hammers of these new iconoclasts struch the figures of the saints even in the houses and private oratories; rich manuscripts covered by paintings were burned.

That is how the 16 th century began in Germany; in fact the people were only an instrument, and the secular nobility alone profited by the reform by secularization, or rather the destruction of the religious establishments. "Treasures of churches and convents," said Melancthon, a faithful disciple of Luther, "the electors kept everything and were not willing to give anything for the support of the schools!"

Yet France under the reign of Francis I commenced to feel the reaction of this revolution, that acted in Germany, and to which Charles V only opposed in indecisive resistance, being occupied with greater projects. Perhaps by weakening the power of the sacred throne the reform served one of his projects, and he thought himself able to direct it in the sense of his politics, and to stop it at his own time. But Luther could not exert the same influence as in Germany; his brutal and coarse words, his sermons filled with abuse gathered in taverns, would not have affected the minds of the enlightened classes of our country; his doctrines were condemned by the Sorbonne, yet they had collected some followers; novelties have always been loved among us; already when Calvin appeared, the diatribes of Luther against the Pope and the princes of the Church had attracted doctors, litarary nobles, scholars in theology, artists jealous of the protection given to Italians, and who believed they had everything to gain by throwing off the system of Rome. Fashion was for the reform; it does not pertain to us to be astonished by these popular impulses, we that have seen a revolution accomplished in a day by the criss of reform. Calvin was born in 1509 at Noyon. Luther, t the Saxon monk, was insolent in speech, empurpled countenance, terible in gesture and voice; Calvin with austere bearing, c cadaverous face, a sickly appearance; he was formal in his d discourses as in his writings; of obstinate and prudent natu-

sovereign nobility only reluctantly paid the subsidies to the sacred throne; compelled to ostentation not in accordance with their resources, then always needed money; when in 1517 Leo X published the indulgences, that he allowed to be preached in Germany, abundant alms contributed to finish the great Christian church S. Peter of Rome were collected by these preachers, while the princes found the gates closed, when they sent collectors to receive the taxes. Then a poor Augustinian monk attacked the indulgences in the puppit at Wittenberg, immediately commenced the struggle with the sacred throne, an ardent contest full of passion on the part of the Saxon monk, who f felt himself supported by the entire nobility of Germany, full of moderation and calm on the part of the Roman pontiffs. This poor monk was Martin Luther. Soon Germany was on fire. Luther triumphed; the secularization of the monasteries was a bait for the cupidity of all these secular princes, who could then lay hands on the property of the abbeys, take away the shrines of gold and silver and the sacred vessels. The secularization of the monasteries occurred because Luther, who exhausted the entire injurious vocabulary against the papacy, bishops and monks, treated with the greatest caution those princes, who could have suppressed his speech by a word. As it occurs when the political equilibrium is destroyed, the people did not hesitate to take part. It was not three years after Luther had commenced war against the power of the court of Rome, when already around him his own disciples left him and divided the reform into innumerable sects; we see arise the Bucerians, Carlstadtians, Zwinglians, Anabaptists, Oecolompadians, Melancthonians and Illyrians; we see however, one Munzer, priest of Alstädt, anabaptist, rouse the peasants of Swabia and Thuringia, perish with them at Franckenhausen under the blows of that nobility, that neglected the reform, and find in Luther as a feeling of pity (who was the cause of these disasters) only these cold words:--"For the ass the thistle, a saddle a and a whip; a wise man said, for the peasant oat straw. If t they will not yield, the cudgel and the musket; that is right. Let us pray that they obey, if not for pity; if the whistle of the arquebuse were not heard, they would be a hundred times worse." [1]

Note 1. p. 161. Letter of Luther to Ruhel. Hist. de la Vie,

an arabesque, a capital, a flower, a mask imitated from imitations of antiquity, instead of its foliage, corbels, kale a and Gothic thistles; but it retained its construction, its procedures in drawing, its arrangements in general and detail.

The arts that developed at the end of the 12 th century came from the Gallo-Roman nation, they are like the reflection of its spirit, its tendencies and its particular genius; we have seen how they grew outside the prilileged classes at the same time as the first political institutions conquered by the citizens. The arts of the Renaissance flowed from an entirely d different source; patronized by the great, by the educated c classes of Frence society, they long found opposition, either from the regular clergy or from the citizen class. We shall examine how they came to rely on the reformation to introduce them definitely on the old Gallo-Roman soil.

About 1483 was born in a little village of the county of M Mansfeld Martin Luther; but first let us glance for an instant at the situation of the high clergy at the end of the 15 th century. Some years later Leo X said:--"Now let us live in feace; the age no longer strikes at the foot of the tree, it merely trims off its branches." Indeed the papacy resting after such long and glorious contests, it reigned over the Christian world as much by the moral power, that it had so laboriouly acquired, as by the extraordinary development it had known how to give to arts and letters. Rome had become the c centre of all light and all progress. The papal court was composed of erudite and learned men, poets, surrounded by a halo of artists, and attracted the attention of all Europe.

In Germany and France the bishops possed feudal powers more or less extensive, entirely like secular nobles. The great r religious establishments, after having long rendered immense services to civilians, after having cleared the uncultivated lands, established mills, drained marshes, extended and preserved the study of Ancient and Christian literature, struggled against the disorderly spirit of secular feudalism, offered a refuge to all physical and moral evils of humanity, finally found repose, for which they were soon to pay largely. In Germany the sovereign power was divided between a great number of ecclesiastical and lay electors, marquises, dukes, counts that depended only on the emperor. The secular portion of that

possession of these new elements, and soon was seen a mixture of its decorations with reminiscences of Italian arts. But an art is not changed from one day to the morrow, no more than a language. Florentine or Milanese artists, that Charles VIII may have brought with him were quite foreign in the midst of North France still entirely Gothic, their influence could not have a direct effect on corporations or trade guilds, accustomed to reproduce the traditional forms of their country. These guilds had become powerful, possessed all branches of the arts, and were not disposed to be dominated by foreigners, w well received at court but very badly regarded by the middle class. Most of these introding artists were soon disgusted, finding only workmen who neither understood not desired to understand them. Besides as it always happens, the men who had decedid to leave Italy to follow Charles VIII into France were not the best of the Italian artists, but rather those m medicrities, who were unable to succeed in their own country, and did not hesitate to seek fortune elsewhere. Attracted by the fine promises of the great, they found themselves on the morrow, when it came to execution, in presence of workmen, s skilful and full of knowledge, not docile, scoffers and sly, systematically awkward, opposing to Italian loquacity a discouraging force of inertia, responding to orders only by that shake of the Gallic head, that presages numberless difficulties, where it was essential to find level ground. The court was won by the new fashion, but could not be informed of all the material differences of the trades, having not the least idea of practical knowldege, then so extensive, or of French constructors, in casting some unfortunate Italian artists permeated by the new forms adopted by Italy (but probably very poor draftsmen or stonecutters) into the midst of those stonecutters and carpenters, acquainted with all the difficulties of geometrical drawing, having a perfect knowledge of the most complicated plans, and daily working with these difficulties; we may say that the court, in spite of all its good will or all its power, could not help that its foreign proteges should soon be regarded as ignorant or impertinent. Thus these attempts to introduce Italian arts into France at the end of the 15 th century had but a small result. Indigenous architecture indeed took some scraps from the Italian Renaissance, placed

word at the end of the 15 th century, it was no longer possible to go beyond that, the matter was submitted, science no longer regarded it, the extreme manual skill of the workman could not be materially exceeded; the mind and reasoning had made of stone, wood, iron and lead all that could be made, e even to passing the limits of good sense. One step farther a and the material would have rebelled, and the monuments could have existed only in sketches or in the brain of the constructor.

From the 14 th century Italy, that had never frankly abandoned antique traditions, and had but partially submitted to the influences of the arts of the East or of the North, revived Roman arts. Philip Brunelleschi, born at Florence in 1375, after having studied the antique monuments of Rome, not merely to know the external forms, but much rather to become acquainted with the procedures employed by Roman constructors, returned to his native land at the beginning of the 15 th century, and after some difficulties caused by routine and envy, he erected the great dome of Church S. Maria of the Flower. Italy preserves all and has transmitted to us the least details of the life of that great architect, who was not restricted to that work alone; he erected citadels, abbeys, churches of S. Lorenzo and of the Holy Spirit at Florence, and palaces. Brunellischi was a man of genius, and may be regarded as the father of the architecture of the Renaissance in Italy, for if he knows and can apply the models offered by antiquity, he gives to his works a great character rarely excelled by his successors, perhaps equalled by Bramante, among so many illustrious artists, who was distinguished by pure taste, simple manner and great moderation in the neans of execution.

At the end of the 15 th century these new marvels, that covered the soil of Italy, made a great rumor in France. When C Charles VIII returned from his foolish campaigns, he brought with him a court astonished by the splendors beyond the mountains, and the antique and modern riches enclosed in the cities traversed by these conquerors of a day. Men afterwards d dreamed only of palaces, gardens decorated by statues, marble fountains, porticos and columns. The arts of Italy became the passion of the moment. Exhausted Gothic architecture was at the end of its means for producing surprising effects, took

long wished to judge the architecture called Gothic. This is nearly as if one would base a judgment on the Roman architecture at Baalbec or Pola, without considering the masterpieces of the age of Augustus.

We must here make a remark of major importance; although t the English domination, politically speaking, may have appeared very secure in the north and west of France during a part of the 14 th and 15 th centuries, we do not know a single edifice, that recalls in those conquered countries the structures then erected in England. The architecture did not cease to remain French. It would not be an error in Normandy or in the western provinces to attribute certain edifices to the English; that they may have built these monuments, we are indeed willing to admit, but they only had recourse to French artists, and the fact is easily proved to one that has seen the architectures of the two countries; the differences are striking in principle, decoration and means of execution. During the 13 th century the two English and French arts differ little, except in details or certain general arrangements of plans, but from the 14 th century these two architectures take different paths, that depart more and more from each other. Until the Renaissance no element came into France to retard or modify the progress of architecture; it is supported by i its own basis, abusing principles, carrying logic to the point of torturing the method by force of will to follow it and to derive from it all the results. All the examples of the D Dictionary show how men necessarily came by an nisensible slope from the 12 th to the 15 th century. Each attempt, effort or new improvement rapidly leads to the climax and as quickly to the decadence, without it being possible to say:-- "one m must stop there." It is an unbroken chain of deductions, not a single link of which can be broken, for they have all been welded by the same prioiple that closed the first one. And we shall say, that it would perhaps be easier to study Gothic architecture by taking it at its decadence, than by successiwely returning from effects to causes, from results to principles, than by following its natural course; thus most of us have been led to the study of the origins of our art, taking it in its decline and ascending the current.

In fact the so-called Gothic architecture had said its last

which form the closures or sashes of their openings, are combined according to the rules of statics, and that the stone always retains its character. Already in the 14 th century t this tracery became too slender and could only maintain itself by the aid of iron armatures; yet the first arrangements are retained. In the 15 th century the tracery of openings, perforated like lace, presents combinations of curves and reverse curves not produced by the construction, and give in its construction sharp prismatic forms, and be solidly maintained o only by tricks of stonecutting, or by the aid of numerous anchors, that became one of the primary causes of the destruction of the stone. Not satisfied by filling openings with stone sashes traced in complex designs, the architects of the 15 th century covered the surfaces of the walls by blind tracery, which is only a facing imitating the openings, where the eye for rest requires a solid. During the 14 th century this custom of masking surfaces by false tracery was much the fashion; but at least in that epoch this sort of decoration was applied in a judicious way (Art. Architecture Religieuse) between supports, in places that by their position should appear light, while in the 15 th century, these decorations by false openings cover the buttresses and all parts of the architecture, which should present an appearance of resistance. It seems t that then the architects had a horror of solids, and could n not allow their supports to appear. All their efforts tend to disguise these, while frequently the walls remain plain, and that are merely a filling and support nothing, then are opened or decorated by arcades or flase openings. Nothing is more shocking than these plain walls between buttresses covered by infinite details of small scale, and that weaken the parts of edifices, to which is attached an idea of strength.

The more distant one is from the royal domain and the more these defects appear in the architecture of the 15 th century, the more the constructors deviate from the principles established during the 13 th and 14 th centuries, employ extravagant combinations, pretend to play tricks with stone, and give to their architecture forms foreign to the nature of the materials, obtained by artificial means, lavishing iron and anchors, attaching and incrusting an ornamentation no longer at the s scale of the edifices. On the monuments of this epoch men have

reappearing, fatigue the eye, occupy more than charm it, force the mind to continual labor, which leaves no place for that calm admiration, that every art work should cause. The surfaces are so divided by an innumerable number of projections, of divided compartments, so that nowhere does one perceive the ground of the construction, no longer comprehends their texture or jointing. Horizontal lines are banished, so that the eye is forced to follow long vertical lines, and knows not w where to stop, and cannot understand why the edifice does not rise always to lose itself in the clouds. Sculpture assumes a greater importance while following the method applied after the 13 th century; in imitating the flora, it carries that imitation to excess and exaggerates relief; the foliage and flowers no longer relate to construction, and it seems that the artists have undertaken to cause belief in petrified superpositions; thus results further a sort of hollows that may seem surprising, that may astonish by the difficulty of execution, but which distracts and may cause loss of sight of the entirety of the edifices. What is admirable in the ornamentation a applied to the architecture of the 13 th century is its perfect harmony with the lines of the architecture, instead of i injuring them, it aids in comprehending the use of a certain form, it cannot be displaced but belongs to the stone. On the contrary in the 15 th century, the ornamentation is merely an addition, that can be omitted without injury to the entirety, just as one removes a decoration of foliage placed on a monument for a festival. This puerile endeavor in the exact imitation of natural objects cannot be allied with the rigid forms of architecture, much less that in the 15 th century these f forms have something sharp, rigorous and geometrical in complete discord with the exaggerated flexibility of the sculpture. The systematic application of the vertical line in the whole as in the details, in spite of the horizontality of the stone construction, shocks good sense even when reason does not consider that effect. (Art. Appareil).

The architects of the 13 th century by diminishing the solids in their edifices, by suppressing the walls and gradually replacing them by openings, were indeed obliged to fill these openings with stone tracery; (Arts. Meneaux, Rose); but it m must be stated, that the compartments of perforated stone, w

Our great churches were almost all completed at the end of t the 13 th century, and except S. Ouen at Rouen, few churches are found begun and completed during the course of the 14 th century. It remained to architects of that epoch only to complete our vast cathedrals or their dependencies.

But during this century civil life takes a greater development, and the nation supported by the royal power commences to play an important part in gradually removing feudalism from the political stage. Cities erected their city halls, markets and ramparts, the citizen class is enriched and builds greater houses, more convenient, where already habits of luxury appear. The feudal nobles give to their castles a less severe aspect; it no longer concerns them to defend themselves against powerful neighbors, to erect fortresses intended to protect them from violence, or to guard the products of their rapine; but their respective rights are better regulated, the sovereignty of the royal power is better established, permitting them to live on their own domains, no longer as conquerors but as owners of property to be governed, as protectors of vassals gathered around their castles, thenceforth these dwellings, formerly so gloomy and so closed, are decorated, large windows are opened to give air and light to the apartments, porticos are built, great halls for giving feasts, or to collect a great assemblage of people; outside the internal enclosures are arranged buildings for strangers; sometimes even galleries, churches, hospitals, intended for the inhabitants of the city or village, came to group themselves around the castle of the nobleman.

The misfortunes that desolated France at the end of the 14 th century and the beginning of the 15 th singularly diminished the impulse given to religious or secular construction. Ar- architecture follows the impulse given during the 13 th and 14 th centuries, gradually losing sight of its point of departure; the profusion of details chokes the general arrangement; rationalism is pushed so far in the combinations of construction and in drawing, that every architectural member produced at the base of the edifice penetrates through all obstacles, ascending vertically to the top without interruption. These piers and mouldings, that affect forms, prismatic, curvilinear, concave with projecting angles, penetrating and always

portal of the cathedral of Paris; the great facade still shows some remains of Romanesque traditions, and the south portal is in an architecture presenting the decadence. (Art. Architecture Religieuse). We no longer find after the end of the 13 th century,particularly in religious architecture, that individual stamp characterizing each edifice typical at the beginning of that century. The grand arrangement, the mode of construction and arrangement already take a monotonous appearance, that renders architecture easier to design, and that f favors mediocrity at the expense of genius. One perceives that common rules are established, and place the art of architecture at the commaud of the most ordinarw talents. All is foreseeu, one form infallibly brings another. Reasoning replaces imagination, logic slays poetry. But also the execution becomes more uniform, more knowing, the choice of materials is m more judicious. It seems that the genius of constructors has nothing more to find, having satisfied its need of novelty by applying itself to details, seeking for the spirit of art. All architeltural members are reduced, sculpture is pleased with executing the infinitely small. The feeling of the entirety, of true grandeur is lost, one desires to be astonished by boldness, by the appearance of lightness and refinement. Scieuce masters art and absorbs it. During the 14 th century is developed the knowledge of the thrusts of vaults, the art of geometrical drawing, and then one sees erected those monuments, that reduce the solids to the least possible dimensions, take the light into interiors in all practicable ways, that one s sees those perforated spires rise toward heaven on supports, that do not seem able to sustain them, that mouldings are divided into an infinite number of members, and that piers consist of groups of little columns as numerous as the arches they support. Sculpture loses its importance, impoverished by the geometrical combinations of the architecture, it seems no longer to find its place, and it is confused because of desiring to be delicate. In spite of the excessive study in the combinations, and because of the rationalism that controls all parts of the architecture, that leaves you cold before so much effort, in which one finds more calculation than inspiration.

It must be stated, that the 13 th century left little to be done in the 14 th in the matter of religious architecture. O

architecture, far from that; one should not forget that French architecture was developed in the midst of a conquered people in presence of its conquerors, it took its inspirations within that indigenous fraction, the most numerous part of the nation, it had fallen into the hands of laymen as soon after the first attempts at emancipation, it was neither theocratic nor feudal. It was an independent art, national, flexible for every need, and erected a castle, house or crurch (Arts. Chateau, Maison, Eglise) by employing the forms and procedures appropriate for each of these edifices; and if there was harmony between the different branches of the art, if they sprung from the same trunk, yet they developed in conditions so diverse, that it is impossible not to distinguish them. Not only did French architecture of the 13 th century adopt the different forms because of the requirements to be satisfied, but again we see it change for the materials employed; if it is a structure of brick, of stone or of wood that is erected, it gives each of these structures a different appearance, that best suited to the nature of the material at command. Wrought iron, bronze and lead, cast or hammered, wood, marble, terra cotta, hard or soft stone, of different dimensions, require forms suitable for each of these materials; and that in such absolute fashion and so well characterized, that by examining a cast or a drawing one can say, "this ornament, moulding, architectural member, is applicable to such a material." This essential quality belongs to the original arts of the fine epochs, while it is generally wanting to the arts in epochs of decadence; it is unnecessary to say how it gives value and charm to the least objects. The judicious use of materials distinguishes the structures of the 13 th century from those that preceded or followed them, it charms men of taste as well as the simplest minds, and nothing less than false education can cause the l loss of the feeling of a law so natural and so true.

But no human work does not contain in germ the principle of its destruction. The qualities of the architecture of the 13 th century are exaggerated and become defects. And the progressive advance was then so rapid, that Gothic architecture, full of youth and power in the first years of the reign of S. Louis, commenced to fall into abuse in 1260. Scarcely 40 years between the construction of the western facade and of the south

show sufficiently, for the little art employed, with what rapidity they were finished. Great military establishments like Coucy, Chateau-Thierry among others, and later Vincennes and Pierrefonds have risen from the ground, and have been delivered to their garrisons in some years. (Arts. Architecture Militaire, Chateau).

In the history of the peoples of these fruitful centuries appears to be contained an immense effort of the intelligence of men, gathered in favorable conditions. These periods of p production are found everywhere at certain epochs, but what especially distinguishes the age that occupies us, is the quantity and the unity in the production. The 13 th century sees born in the intellectual order of men, such as Albert the Great, S. Thomas Aquinas, Roger Bacon, philosophers, learned e encyclopedists and theologians, all whose efforts tend to systematize the knowledge acquired in their time, to gather the debris of the sciences and of antique philosophy to submit t them to the Christian mind, to hasten the spiritual movement of their contemporaries. The study and practice of the arts uere coordinated, then following a regular advance in the same direction. We cannot better compare the development of the a arts at that epoch, than to a crystallization; a synthetic w work, all whose parts unite according to a fixed law, logical and harmonious, to form a homogeneous whole, no fraction of which cau be destroyed without destroying the entirety.

Science and art make but one in the architecture of the 13 th century, the form is only the result of the mathematical law, just as in the moral order, faith and beliefs seek to establish themselves on human reason, on proofs derived from the Scriptures, observation of physical facts, and they risk themselves with remarkable boldness and grandeur of view in the field of discussion. Happily for that great age the highest minds were orthodox. Albert the Great and his pupil S. T Thomas Aquinas concentrated the knowledge, that they had been able to acquire, the singular penetration of their intellects toward the dominant point, theology. This tendency is also t that of the arts of the 13 th century, and explains their highest unity.

But it is unnecessary to believe that religious architecture was the only one, and that it imposed its forms on secular a

in obtaining the desired effect.(Arts. Peinture, Vitraux). We state here that these two arts (sculpture and painting) submit entirely to architecture, when it reaches its climax, resuming a certain independence, that however profits little to them, when architecture degenerates.

From what many of our great edifices of the middle ages commenced at the end of the 12 th century and completed during the 14 th and 15 th, it has been concluded, that two or three centuries were required to build them, which is not correct; perhaps never, except in our days, have structures been ereced more rapidly than during the 13 th and 14 th centuries. But these monuments, built by means of the private resources of bishops, monasteries, chapters or nobles, were often interrupted by political events or lack of money; but when resources were not lacking, architects carried on their works with prodigious rapidity; examples are not wanting to justify this assertion. The new cathedral of Paris was founded in 1168; in 1196 the choir was finished; in 1220 it was entirely completed; the chapels of the nave, the two transept gables, and the chapels of the choir being only modifications of the primitive edifice, which it could have done without. (Art. Cathedrale). Here was an immense monument, that cost not less than 60 to 70 millions of our money($12,000,000 to 14.000,000), erected in 50 years. Nearly all our great cathedrals have been built in such a limited number of years, excepting the later additions. The S. Chapelle of Paris was erected and entirely finished in less than eight years.(Art. Chapelle). When one thinks of such an innumerable quantity of statues, sculptures, enormous areas of stained glass windows, ornaments of all kinds entering into the composition of these monuments, he will be amazed by the activity and number of the artists, artizans a and laborers at command then, particularly when he knows that all these sculptures, either of ornaments or figures, and the stained glass windous were completed as the work proceeded.

If these vast religious monuments, covered by rich decorations, could be constructed so rapidly, by yet stronger reasons monasteries, castles of a quite simple architecture in general, and that must satisfy immediate material needs, should be erected in a very brief space of time. When dates of beginning and of completion are wanting, the structures are there, which

with the masters belonging to the regular orders, who never commenced and edifice except after having long collected in advance the necessary materials, and when with care they had collected sufficient sums, and matured their projects by study. It seems that lay architects did not trouble themselves much with the details of execution, that they hastened to finish their work, that they were already under the control of that fever of investigation and activity, that dominates all modern civilization. Even in the monuments rapidly built, it is felt that the art is modified as the buildiug progresses, and these modifications always bend it to the more absolute application of the principles on which Gothic architecture is based; this is a constant experience. Symmetry, that need of the human m mind, is itself even sacrificed to the incessant search for absolute truth, for the last limit which the material can attain; and rather than continue according to the same principles a work, that appears imperfect, ready to destroy the symmetry, the architect of the 13 th century did not hesitate to modify his primitive arrangements, to apply at once his new idear, developed under the inspiration of the principle directing him. Thus how many monuments of that epoch were commenced with hesitation under a direction still uncertain, although rapidly executed, developed in the thought of the constructor learning his art and perfecting each course, so to speak, and only ceasing to seek the best when the work is finished! It is not alone in the general arrangement that is noted the rapid progress; all the workmen are moved by the same feelings. Sculpture daily abandons the hieratic forms of the 11 th and 12 th centuries to imitate nature. Greater care to seek for expression, and to make the movement understood better. The ornamentist who first applies himself to giving his plants a monumental appearance, and goer to seek his models in the germs of plants, rapidly comes to copying accurately leaves and flowers, and to reproduce in stone the appearance and freedom of plants. Painting advances more slowly in the path of progress followed by the other arts, it is more attached to traditions, aud it retains the conventional types longer than its sister sculpture; yet called to play a great part in the decoration of edifices, it is carried onward by the general movement, it allies itself more frankly with architecture to aid

for example, scarcely rejected Romanesque traditions, and adopted the new mode of construction and decoration with all its rigorous consequences. (For examples see Arts. Architecture Religieuse, Monastique, Civile et Militaire). It is careful only at the end of the 13 th century, that these distinctions are effaced entirely, that the provincial genius is lost in the royal domain to change itself into a single architecture, that successively extended over the entire area of France. However Auvergne (except for the construction of the cathedral of Clermont-Farraod) and Provence never adopted Gothic architecture, and the last province (that became French only at t the end of the 15 th century) passed from degenerate Romanesque architecture to the architecture of the Renaissance, having been subjected to the influences of the monuments of the North only very late and in an imperfect manner. The centre of French architecture then in the 13 th century is concentrated in the royal domain, where were built those vast cathedrals, that we admire yet today, mysterious palaces, great public establishments, castles and formidable fortifications, with rich monasteries. But in losing its personal or provincial originality, in passing exclusiwely into the hands of the lay guilds, architecture is no longer executed with that minute care in detail, with that inquiry in the selection of materials, that strikes us in edifices built at the end of the 12 th century, when the lay architects were still permeated by monastic traditions. If we set aside some rare edifices, like the S. Chapelle of the Palace, the cathedral of Rheims, certain parts of the cathedral of Paris, we may note that the monuments erected during the course of the 13 th century are frequently as careless in their execution as wisely combined in the system of construction. There appears in these s structures the spirit of the contract; it is necessary to do much and rapidly with little money, one is hurried, neglects the foundations, erects the monuments with rapidity by using all the materials, good or bad, without taking time to select them. Stones are taken from the hands of the workmen before they have had time to cut them properly, joints are irregular, the rubble is placed in haste. Construction is abruptly stopped, and as abruptly resumed with profound modifications of the primitive projects. This wise slowness is found again only

maintained only by the combination and development of the upper parts. The Gothic edifice remains standing only on condition of being complete; one cannot omit one of its organs without seeing it fall, for it acquires stability only by the laws of equilibrium. That is one of the reproaches most freely made to this architecture, not without some appearance of justice. But could not alos one blame man for the perfection of his organization and regard him as a creature inferior to reptiles, for example, because he is more sensitive than they to external agents and more fragile? In Gothic architecture matter is subjected to the idea, it is only one of the consequences of the modest spirit, itself derived from Christianity.

However the principle directing that architecture, because based on human reasoning, could not stop at a form; from the moment that architecture was identified with the idea of an epoch and a people, it could not fail to modify itself at the same time as its ideas. During the reign of Philip August, it was perceived that the art of architecture progressed in the new path under the influence of men connected by a community of principles, but still retainiug their appearance and their original personalities. Some were still attached to Romanesque traditions, more timid and applying only with reserve the synthetic method, others were bolder and resolutely adopted it; that is why are found in certain edifices built contemporaneously at the end of the 12 th and during the first years of the 13 th century, notable differences in the system of construction and decoration; experiments serving as points of departure from rules followed, or that will be abandoned shortly after their appearance. These artists proceed in the same sense, but in retaining their own genius, form as many little p provincial schools, that daily tend to approach each other, and differ only in certain arrangements of details of minor importance.

From 1220 these schools could be classified thus:-- schools of Ile-de-France, of Champagne, of Picardy, of Burgundy, of Maine and Anjou, and of Normandy. These divisions are not so sharp that one cannot find intermediate edifices belonging t at the same time to two; their development follows the order here given; there were built already in Ile-de-France and Champagne edifices absolutely Gothic, when Anjou and Normandy,

If we follow the logical results of this principle derived from Christian ideas, we shall again see architectural forms submit themselves to the material, employ in each locality s such as nature supplies. If the materials are small, the architectural members take a moderate importance (Art. Construction); if they are large, the mouldings, ornaments and details are large; if they are fine and eary to work, architecture p profits by it in refining its ornamentation and making it more delicate; if they are coarse and hard, it is simplified. All in pointed architecture takes its place and retains its quality, each man and each object count for what they are, as in creation each thing has its purpose traced by the divine hand. And as it seems that this art should not cease to be methodical, even in its decoration, we see it from its origin abandon all ornaments left by Roman-Byzantine traditions for covering its friezes, cornices, cavettos, capitals, its vaults with f flowers and leaves borrowed from the forests and fields of N North France. A marvellous thing! The imitation of plants seems to follow an order conformed to that of nature, and examples are there to speak for themselves. The buds are the first sensible appearances of vegetation, buds give birth to shoots or young branches charged with leaves or flowers. Well, when French architecture at the end of the 12 th century took possession of the flora as a means of ornamentation, it commenced by imitating cotyledons, buds and shoots, soon arriving at the reproduction of developed branches and leaves. (See proofs in Art. Flore). It is unnecessary to state, that this synthetic method is followed for stronger reasons in statics, in all means employed by architecture to resist destrictive agents. Thus the pyramidal form is adopted as the most stable, horizontal planes are excluded as stopping rainwater, and are replaced without exception by strongly inclined planes. Besides their general principles, if we examine the details, we shall be struck by the internal arrangement of these edifices. Just as the human body rests on the ground and moves by means of two simple supports, slender and occupying the smallest s space possible, is complicated and developed as it must contain a great number of important organs, likewise the Gothic edifice places its points of support according to the simplest principles, a sort of scaffolding whose stability is maintain-

considered after reasoning, that when a man has been placed near them for comparison, again it is rather the man that appearr little, and not that the monument seems great. Whether this be an advantage o a defect, we shall not discuss this point, only stating the fact that is of the highest importance, for it hollows an abyss between the methods of antique art a and that of the middle ages.

We shall not say that the art born at the end of the 12 th century on a portion of the soil of France is above all a Christian art; S. Peter of Rome, S. Sophia of Constantenople, S. Paul-f.l-M, S. Mark of Venice, our Romanesque churches of Auvergne and Poitou, are Christian monuments, since they were built by Christians for the use of the worship. Christianity is sublime in the catacombs, in the deserts, as in S. Peter of Rome or in the cathedral of Chartres. But we shall ask; w without Christianity, would the monuments of North France have been erected? Evidently not. This great principle of unity of scale just presented to our readers, is it no a symbolical s seizing on the Christian mind? To place thus a man in relations with God, even in the most vast and most magnificent temples by the constant comparison of his littleness with the grandeur of the relegious monument, is not there a Christian idea? Which strikes most peaple? Is not the application of t this method rigorously followed in our monuments, that always inspire this indefinable feeling of respect before great Gothic churches? The architects of the 12 th and 13 th centuries have always applied this principle by instinct and reasoning, it has always governed all religious, secular or military structures until the epoch of the Renaissance of the antique. Architects of the pointed epoch were as consistent in the use of the new forms as were Greek architects in the application of their system of proportions of the orders, independently of dimensions. Among the latter, architecture was an abstract art; Greek art is a unit, and it orders rather than obeys; it commands materials and men; it is the antique fate; while western architects of the middle ages were subject to Christian law, which recognized the sovereign power divine, and left to man his free will, responsibility for his own works, and of accounting for a creation made in the image of the Creator, however low may he be.

of their time, just as Aristotle could have done, if he had lived in the 12 th century, and the form they gave to art objects was derived from the needs or the ideas of the moment. Let us take a very striking example, fundamental in architecture, the scale. Everyone knows that the orders in the architecture of the Greeks and Romans may be regarded as typical u units, that one employs in edifices by increasing or diminishing their dimensions and retaining their proportions, according as these edifices are more or less great in scale. Thus the Parthenon and the temple of Theseus at Athens are of very different dimensions, and the Doric order applied to these t two monuments is nearly identical in proportions; to make ourselves better understood, we shall say that the Doric order of the Parthenon is the Doric order of the temple of Theseus viewed through an enlarging glass. Nothing in the antique orders, Greek or Roman, recalls a single scale, and yet for these monuments is an invariable, let us say imperative scale, which is man. The dimension of man does not change, whether the monument be large or small. Thus take the geometrical drawing of an antique temple, neglecting to give the dimensions or to draw the scale, it will be impossible to state whether these columns are 10, 13 or 33 ft. in height, while for Gothic architecture this is not so, the human scale is found everywhere independently of the dimension of the edifices. Enter t the cathedral of Rheims or a village church of the same epoch, and you will find the same heights, the same moulded bases; the columns elongate or shorten, but retain the same diameter, the mouldings are multiplied in a great edifice, but ara of the same dimensions as those of the little one; the balustrades, window sills, plinths, benches, galleries, reliefs, all the details of the architecture found in the arrangement of the edifices, always recall the type scale, the dimension of a man. The man appears in everything; the monument is made f for him, it is his vestment, and however vast and rich it may be, it is always for his stature. Thus the conuments of the middle ages appear greater than they actually are, because in the absence of man, the human scale is everywhere recalled, because the eye is constantly forced to compare the dimensions of the whole with the human module. The contrary impression is produced by antique monuments. Their dimensions are only

edifices after the 16 th century, but on the contrary are freely accented, and contribute by their ingenious combination and the taste always controlling their execution, to the richness of the architecture. In a beautiful edifice of the beginning of the 13 th century, however splendid it be assumed, there is no ornament to be removed, for each ornament is merely the result of a satisfied need. If one seeks imitations of these e edifices built outside France, there is found only strangeness; these imitations only employ the forms without divining the reasons for their existence. It explains why, because of our custom to wish to seek our good afar(as if distance gave it more value), citizens most aroused against the architecture called Gothic nearly always have in view such edifices as the cathedrals of Milan, Siena, Florence and certain German churches, but have never thought of traveling twenty leagues to seriously examine the construction of the cathedrals of Amiens, Chartres or Rheims. It is not necessary to go to study or judge French architecture of that epoch where it has been exported, but it must be seen and judged on the soil that saw its birth, in the midst of the various material or moral elements by which it was nursed; it is further so intimately connected with our history, the intellectual conquests of our c country, to our national character reproduced in its principal features, tendencies and direction, that one can scarcely comphehend how it may not be better known and better appreciated, and one cannot conceive why the study of it is not presscribed in our schools like the teaching of our history.

It is precisely at the time when researches in literature, science, antique philosophy and legislation are pursued with ardor, during this 12 th century, that architecture abandons the last remains of antique tradition to found a new art, whose principle is in manifest opposition to the principle of the arts of antiquity. Must one conclude from that, that men of the 12 th century were not consistent to themselves? Entirely the contrary; but what distinguishes the renaissance of the 12 th century from that of the 16 th, is that the first was permeated by the antique spirit, while the second allowed itself to be seduced by the form. The dialecticians of the 12 th century in studying the pagan authors, the fathers and the Scriptures, saw matters and men of their time with the eyes

oblique resistances to maintain them.(Arts. construction, Voute). Already from the middle of the 12 th century constructors had recognized that the round arch had a thrust to great to be elevated at a great height on thin walls or isolated p-piers, pasticularly in wide naves, unless maintained by enormous buttresses.; they replaced the round arch by the pointed arch (Art. Arc), only retaining the round arch for windows a and doorways of small width; they entirely rejected the tunnel vault, whose continuous thrush could only be resisted by a continuous buttress. Reducing the resisting parts of their structures to piers, they strove to throw all the weight and thrust of their vaults on those piers, then only having to maintain them by independent flying buttresses and transferring all loads outside these great edifices. To give more stability to these isolated piers or buttresses, they loaded them with an additional weight, that they soon made one of the richest motives of ornamentation (Art. pinacle). Making their edifices gradually lighter, and recognizing in the pointed a arch a great resistance and at the same time only a weak thrust, they applied it everywhere, while abandoning the round arch, even in secular architecture.

From the beginning of the 13 th century, architecture developed according to an entirely new method, all whose parts are derived from the others with imperious rigor. Now by the change of method commence revolutions in science and arts. Construction commands the form, the piers destined to support several arches were divided in as many columns, these having d diameters more or less great according to the loads that must be laid on them, each rising on its side to the vaults it must support, their capitals assuming an importance proportioned to that load. The arches are narrow or wide, composed of one or several rows of voussoirs, according to their functions. (Arts. Arc, Construction). The walls become useless and entirely disappeared in great edifices, being replaced by openings, decorated by stained glass. Every need is a motive of decoration; the roofs, the discharge of rainwater, the introduction of daylight, the means of access and the circulation at the different stories of buildings, to such small articles as iron fixtures, leadwork, anchors, supports, means of heating, ventilation, not only are not concealed, as frequently in our e

force, but by intellectual work that fermented from the 11 th century. Protected by the royal power, they enclosed it by a halo, that did not cease shining with vivid splendor until a after the epoch of the Renaissance. No people, except perhaps the Athenians, more readily threw aside traditions; this was both its defect and its character; always to desire to find something better, without stopping, it advanced as rapidly in the good as in the bad, it passionately adhered to an idea, and when this was pursued into its last entrenchments, when it was bared by analysis, when it commended to germinate in the midst of its neighboring peoples, it rejected this to follow another with like enthusiasm, abandoning the first as wornout, old, like a corpse from which nothing could be derived. This character remains ours today, in our time it has produced beautiful and wretched things; finally it is what has been c called fashion for nearly three centuries, which adheres to the futilities of life, like the most serious social principles, which is ridiculous or terrible, graceful or full of grandeur.

One should take into account this character peculiar to a part of France, if it be desired to explain and to comprehend the great movement of the arts at the end of the 12 th century; we merely indicate it here, since we shall return to each division of the architecture in Analyzing the forms adopted by these divisions. It is unnecessary to say that this movement was restrained while theoretical or practical architecture remained in the hands of the religious establishments; everything aided in arresting it; traditions were necessarily followed, the rigor of cloistered life, reforms attempted and obtained within the clergy during the 11 th century and a part of the 12 th. But when architecture had passed from the hands of clerics to those of laics, the national genius did not delay in taking charge, hastened to free itself from the Romanesque covering, in which it found itself inconvenienced, and understood how to burst it; one of its first attempts was the construction of vaults. Profiting by quite confused results obtained till then, pursuing its aim with that rigorous logic, that in that epoch formed the basis of all intellectual work, it established the principle already developed under the Art. Arc-boutant, that vaults producing oblique thrusts required

compelled the use of defensive arrangements in accordance with this progress.(Arts. Architecture Religieuse, Civile, Militaire . It is necessary to erect larger churches, in which the internal supports must occupy the least areas possible, to ventilate and light them, make them easier of access, better enclosed, more sanitary and better adapted to contain the multitude. In nearly all provinces of the North, Romanesque churches not being combined in construction to endure (Art. Construction); they fell or theatened to fall, so that it was necessary to rebuild them. It was necessary to erect palaces or castles for a greater number of persons, for feudalism everywhere followed the movement impressed by the monarchy; and if the king assumed greater authority over his great vassals, t these absorbed the little fiefs and daily centralized power among themselves, as the king centralized it around himself. It was necessary for those newly enfranchised citizens and f for these increasing guilds places of assembly, city halls, exchanges or parlors as then called, chambers for State bodies, houses according to the more refined manners and more numerous requirements. Finally for these enfranchised cities w were needed external walls, for they perfectly understood that a conquest to be durable, must always be prepared for defense. There was the necessity for rebuilding all the edifices a method in harmony with a new social condition. It should not be forgotten that the soil was covered by ruins, the feudal contests, the invasions of the Normans, the establishment of communes, not done without great broils and popular excesses; t the ignorance of the constructors, who had erected these edifices of little durability, left all to be built. Besides that imperative necessity sufficiently explained by the history of that epoch, arose a new taste in the midst of that Gallo-Roman population resuming its work as a nation; we have attempted to indicate the different sources whence this taste sought i its inspirations, but before all it adhered to the genius of the people, that occupied the villas of the Saone, Loire and Somme. These peoples were endowed with a facile and invertive spirit, quick to seize the practical side of things, active, mobile, thoughtful, directed rather by good sense than imagination, apparently destined by providence to break the last f fetters of barbarism in Gaul, not by abrupt means and material

society, whatever be the class to which he belongs. The arts, then entirely rejecting antique tradition, became the individual expression of the artist, who contributes to the general work without caring for the arrangement, but adding to it his particular inspiration; there are both unity and great variety. Guilds should produce this result, if they establish fixed r rules in their organization, and do not impose them on unchangeable forms, like modern academies. Besides unity is the great need and the tendency of that epoch, but it is not yet t tyrannical, and if it obliges the sculptor or painter to restrict himself within certain monumental requirements, it leaves to each great freedom in execution. The architect gives the height of a capital or frieze, imposes their arrangement, but the sculptor can make this capital or bit of frieze his own work, and can move within his sphere by taking the responsibility for his work. The architecture itself of the 12 th and 13 th centuries, while subjected to a uniform method, based on absolute principles, retains the greatest freedom in the application of these principles; the numerous examples g given in this Dictionary demonstrate what we assert here. With the lay invasion of the realm of the arts commences an era of progress, so rapid that one can scarcely follow its trace; a monument is no sooner erected, than it serves as a sort of s step, so to speak, to that to be founded; a new method of construction or decoration is no sooner attempted, than it is p pushed to its last limits with an incredibly logical rigor.

In the history of the arts must be distinguished two elements; necessity and taste. At the end of the 12 th century nearly all Romanesque monuments, religious, secular or military, could no longer satisfy the new needs, particularly in the s royal domain. The narrow Romanesque churches were encumbered by those massive piers without spaces, and were not suited f for the numerous assemblages of believers, in cities with rapidly increasiug population; they were dark and drearw, rude in appearance, no longer in harmony with customs and a civilization alreadw advanced; the houses and castles presented t the same inconveniences in a still more shocking fashion, since habitual life could not accommodate itself to dwellings in which none of the new needs were satisfied. As for military architecture, the improvements made in the means of attack c

requires the very rapid use of an enormous mass of materials; consequently an immense number of workmen, means of provision and transportation on a very great scale. The Romans had at command armies accustomed to public works, who could throw a nation of enslaved barbarians on a structure, having adopted the method best suited for that social status. To erect one of these great edifices then, very skilful workmen were not needed; some special men to direct the construction, painters and stuccoers to cover these masses of masonry with a rich f facing, some Greek artists to carve the marbles employed, and behind these intelligent men, arms to break boulders, carry up bricks, make the mortar or tamp the concrete. However distant from the capital was the place where the Romans built a circus, baths, aqueducts, basilicas or palaces, the same methods of construction were employed; the Roman monument is everywhere Roman, in spite of soil, climate, even materials, but never the work of an artist. From the moment that Rome comes everywhere, it alone rules, effacing everything foreign to it; there is its power, and its arts follow the impulse given by its politics. When it takes possession of a region, it takes from the conquered people neither its gods nor local customs, but it plants there its temples, builds its vast public buildings, establishes its political administration, and soon the importance of its establishments, its administrative organization absorbs the last vestiges of the civilizations on which its shadow is cast. Certainly there is a beautiful subject of study and observation, but in the midst of this unknown power man disappears, he is only one of the infinite wheels in the great political machine. Greece itself, such a brilliant focus of the arts and of all that tends to the development of the human mind, Greece is extinguished under the influence of Rome. Christianity alone could struggle against the giant by restoring to the isolated man the feeling of his personality. But it requires centuries for the remains of pagan civilization to disappear. We have been able to consider but one of the p parts of this great human work in the middle ages; at the end of the 12 th century all these principles, that should ensure the triumph of ideas produced by Christianity are fixed (to only speak of the subject occupying us), the principle of personal resfonsibility appears; man counts for something in so-

followed everywhere in the structures erected in the cities, market-towns and simple villages; the monastic establishments were soon drawn into the current excavated by the new art. Around important monuments like cathedrals, bishops' palaces, palaces and castles arose thousands of edifices for which the great and rich structures served as types, like children of the same family. The mother monument contains special arrangements sometimes required by the exceptional form of the ground, by a local need, or by the taste of the architect erecting it, and these same arrangements are found in the secondary edifices, although not indicated by necessity. An accident d during construction, an alteration or the lack of resources caused modifications in the typical project, and the imitations sometimes go so far as to reproduce these defects, errors or poverty resulting from this penury.

What is most striking in the new system of architecture adopted from the end of the 12 th century is, that it entirely frees itself from Roman traditions. It is unnecessary to believe that from that freedom results disorder or caprice; on the contrary all is orderly, logical and harmonious; once this principle is fixed, the consequences follow with a rigor not admitting exceptions. Even the defects of this architecture are derived from its principle imperatively followed. In French architecture, which was born with the 13 th century, the arrangements, construction, statics, ornamentation, and scale differ absolutely from the arrangement, construction, statics, ornamentation and scale followed in antique architecture. In studying these two arts, it is necessary to stand at two opposite points of view; if one wishes to judge one by the depending on the principles that direct the other; they will both be found abused. This explains the strange prejudices, the errors and contradictions with which abound the cities belonging to the two opposed camps of the defenders of antique and Gothic art. These two arts have no need of being defended, they are both the results of two civilizations starting from different principles. One may prefer Roman civilization to the c civilization born with the French monarchy, but neither can be annulled; it seems useless to compare them, but one will find profit in studying them.

The Roman monument is a sort of cast on a form, that requi-

moment when a new conquest by the monarchy in these provinces abruptly destroys its last vestiges, by planting abruptly and without transition a monument taken from the royal domain, j just as one plants a stardard in the midst of a conquered city. From the 13 th century architecture follows step by step the royal power, accompanies it, appears to form a part of its p prerogatives; it develops with energy where power is strong and uncontested; it is mixed and its forms are uncertain where power is weak and opposed.

Note 1. p. 128. The name of Romanesque architecture is very vague, if not false. The Romanesque language "was restricted to a soil with known limits, on this side and beyond the Loire? Can as much be said of the architecture designated by the n name of Romanesque? (See in the previously cited Article of M. Vitet, p. 30, 31, the judicious criticism of that name).

During the last years of the 12 th century and at the beginning of the 13 th all the great cathedrals of the royal domain were founded, and almost entirely completed on new plans. Notre Dame of Paris, Notre Dame of Chartres, the cathedrals of Bourges, Laon, Soissons, Meaux, Noyon, Amiens, Rouen, Cambrai, Arras, Tours, Seez, Coutances and Bayeux were commenced under the reign of Philip August to be nearly all completed at the end of the 13 th century. Champagne, so strongly connected politically to the royal domain under S. Louis, erected on its part the great cathedrals of Rheims, Chalons and Troyes. Burgundy and Bourbonnais followed the new direction impressed on architecture, and built the cathedrals of Auxerre, Nevers and Lyons. Soon the vicinity of Carcassonne formed a part of the royal domain, and alone received the direct influences of the official architecture in the midst of countries, that continued until the 15 th century the degenerate Romanesque traditions. As for Guienne, which remained an appanage of the crown of England until under Charles V, and as for Provence, t that only became French under Louis XI, the architecture of the royal domain did not penetrate there, or at least only p produced bad imitations, that seemed foreign in the midst of these countries. In Brittany it developed but slowly and always retained a character belonging as much to England as to Normandy and Maine. We give here (2) the divisions in France at the death of Philip August in 1223. This movement is foll-

influence, as it is agreed to name it, is then very differently exerted in the provinces included in France of that epoch. The art of the sculptor applied to architecture developed on account of the same causes, at the end of the 11 th century. In Provence, along the length of the Rhone aud Saone, in Burgundy, Champagne, county of Toulouse, at the mouth of the Gironde, in Angoumois, Saintonge and Poitou, finally everywhere that Roman monuments had left rich ruins, there were found schools of sculpturs; but the architecture of Normandy, the North and the Rhine, was then as poor in statuary as it was rich in combinations of oriental designs.

During the 12 th century the royal domain, although reduced to a very limited area, remained almost outside these influences, or rather it had been very slightly affected by all, re taining more than any other county of France the pure Gallo-Roman tradition. At the end of the 11 th century and the beginning of the 12 th, under the reign of Philip August, the r royal domain in extending rejected everything excessive in t these foreign elements, so to speak, it chose among all these elements those best suited to its tastes and habits, and it formed a national art,as it founded a national government.

Romanesque architecture was lacking at the centre, [1] a unity of influence by which it could become the art of a nation; taught and practised, as we have said, by religious establishments, it was subjected to their special rules, regulations without any other bond between them than the papacy, being u unable to exert auy material effect on the art forms. This a architecture was compelled either to remain stationary or to adopt elements of progress from all sides, according to the caprices or tastes of the abbots. But when the unity of the monarchic power began to be established, this unity was seconded by lay artists belonging to the recognized guilds,and must by the natural force of thingsform an art centre, that radiated to all sides at the same time as its political action. T This result is apparent from the beginning of the 13 th century. Romanesque architecture gradually became extinct, atrophied under the architecture introduced by lay artists, it retreats before this advance, it continues indecisive for some time in monastic establishments, in the provinces where the action of the monarchical power is not yet felt, until the m

and to form a State. They must find the remains of Carlovingian arts in the territory on which they settled, they combined with these their national genius, positive, great, perhaps slightly savage, and yet free.

This people having frequent relations with Maine, Anjou, P Poitou and the entire western side of France, the Byzantine taste also affected Norman architecture. But instead if affecting the construction, as in Perigord or Angoumois, it influenced the decoration. let us not lose sight of these storehouses of articles or wares from the Levant placed at the centre of France. The Venetians brought into France not only pepper and cinnamon, but also fabrics of silk and ol gold charged with rich ornaments, scrolls, strange animals, fabrics then manufactured in Syria, Bagdad, Egypt, on the coasts of Asia Minor, at Constantinople, in Sicily and Sfain. These fabrics of oriental origin, that are found in nearly all the tombs of the 12 th century or on paintings, were much in fashion at t that epoch; the high clergy particularly employed them in priestly vestments, for the screens or coverings of altars (Art. Autel), to cover the shrines of sain s. The Saracen rugs, as they were then called, and which were made in Persia, were p placed in churches or palaces of rich nobles. The first crusades and the conquests of the Normans in Sicily and the East only extended farther in Frauce and principally in Normandy the taste for these admirable fabrics, so brilliant and harmonious in color, of such pure and graceful design. The architecture of Saintonge, Poitou, Anjou, Maine and particularly of Normandy, took possession of those designs and this mode of coloring. Everywhere that Roman monuments with a certain richness of ornamentation then existed in the West, the influence of these fabrics on architecture is scarcely perceptible; thus at Perigueux for example, in antique Vesone filled with Roman ruins, as we have already stated, that if the form of religious edifices was borrowed from the East, the decoration remains Roman; but in countries like Normandy, where fragments of Roman sculpture left no traces, the decoration of monuments of the 11 th and 12 th centuries recalls those rich laces, those skilfully arranged scholls, that are found on fabrics from the Levant, (Art. Ornement), while the general form of the architecture retains ~~Gallo-Roman~~ traditions. The Byzantine inf-

with domes in France. If S. Front is a copy of the plan and general arrangement of S. Mark of Venice, this does not mean that this abbey church may be the only source from which men drew to make churches with domes in all Aquitaine during the course of the 11 th and 12 th centuries; S. Front may have b been the origin of the churches with domes in Perigord and Angoumois, but we believe that the domes of the churches of Auvergne, for example, those of the cathedral of Puy, received their influence directly from the East, or rather from the A Adriatic, through the intermediary of Venetian commerce. [1]

1. p. 135. Arche. Byz. en France. De Vermeilh. paris. 1852.

Note 1. p. 137. The same.

Note 1.p. 138. See Art. by M. Vitet in Journal des Savants. Jan., Feb. and May, 1853, on the book by De Verneilh.

However that may be, taking the facts as produced in the monuments of Aquitaine during the 11 th and 12 th centuries, it has a considerable importance in the history of French architecture; its results make themselves felt during the 13 th century in that province and outside it (Arts. Architecture Religieuse, construction). The cathedrals of Poitiers, Angers and even Mans, retain in that mode of constructing vaults over the great naves a last trace of the dome.

In the Northwest of France, the monuments that existed before the invasion of the Normans are unknown to us, the incursions of the Danes leaving nothing standing behind them; but soon as established on the soil, these barbarians became bold and active constructors. In the space of a century and a half, they cover the country, on which they have definitely settled, with religious, monastic or secular edifices of an extent and richness then uncommon. It is difficult to assume that the N Normans brought from Norway the elements of art; but they possessed a persistent and acute mind, their brutal force did n not lack grandeur. Conquering, they erected castles to ensure their supremacy, they soon recognized the moral power of the clergy, and they endowed it richly. Further hurried to attain their ends, when they perceived them, they left none of their undertakings unfinished, and in that differed entirely from the southern peoples of Gaul; tenacious, they were perhaps t the only barbarous people established in Gaul, that had ideas of order, the only one that knew how to retain their conquests

11 th aod 12 th centuries. The manuscript collection of antiquities of Limoges, cited by M. de Verneilh, [1] places the arrival of the Venetians in that city between the years 988 and 989; speaking of their commerce it contains this passage:- "The old records of the country relate, that anciently the Venetians trafficing in the merchandize of the East, not being able to take their vessels and galleys coming from the East through the Mediterranean into the ocean by the strait of Gibraltar, on account of some rocks obstructing the said strait, therefore came to dwell at Limoges, at which place they established the market of Venice, bringing spices and other merchandize from the Levant, left ship at Aigues-Morts, then going to Limoges by mules and wagons, thence to Rochelle, Brittant, England, Scotland and Ireland; the said Venetians dwelt long at Limoges, and remained near the abbey of S. Martin, that t the rebuilt on the old ruins made by the Danes (Normans)".If the Venetians had established themselves in Aquitaine only to locate a market intended to supply the commerce of"England, Scotland and Ireland," they would not have taken Limoges as a place of supply, but some city on the seashore; this market established at Limoges in the centre of Aquitaine, it seems to us, indicates the manifest need of furnishing spices, rich fabrics, Levantine wares, to all the provinces of France as well as the countries beyond the sea. At an epoch when the a art of architecture had still to seek the route it should follow, where it was sought to replace in religious edifices completely destroyed by fire with vaults of stone (Art. Construction), when constructors only knew the tunnel vault, applicable only to small monuments, it is not surprising that rich foreign merchants should have boasted of the edifices of their native country, that they may have offered to bring drawings, or to send the monk architects of Aquitaine to visit and study the churches of Venice and the shores of the Adriatic. The d dome could thus be introduced into the centre of France by a hundred different ways; each architect that received a foreign design or visited the churches of the Adriatic, interpreted in his own way and with more or less intelligence the information sent him, or what he could obtain at the place. There w would then be an exaggeration, we think, in regarding S. Front of Perigueux as the type, the mother church of all the monuments

North of the Garonne, and emphasizes the importance of the m monastic schools of architecture until the end of the 12 th century. One of our most distinguished archaeologists [1] explains this transfusion of oriental architecture into the extreme West by the presence of Venetian colonies established then at Limoges and on the western shore. Then the passage of the strait of Gibraltar presented the greatest risks because of the numerous Arab pirates, who held the shores of Spain and Africa, and all the commerce of the Levant with the shores of north France and England passed through Marseilles or Narbonne, then overland by Limoges to regain the sea at Rochelle or Nantes. But the abbey church of S. Front at Perigueux is distinguished as much by its plan, that has nothing analogous in France, as by the arrangement of its domes on pendentives. (Art. Architecture Religieuse). There was indeed a foreign importation, one that extends very far from Perigueux, which c causes the supposition,that if the church of S. Front exercised an influence on the religious architecture of the western coast, that church cannot be regarded as the mother of all c churches with domes built in France during the 12 th century. It must be admitted that commerce in transit from the Levant imported into the middle and West of France foreign principles of art, to all points where a certain activity existed, and probably where marts had been established by the incredible Venetian activity. On these matters contemporary written documents are so insufficient or brief, that it does not seem to us, that one should depend only on such incomplete information, to establish a system; but if we examine the facts, and if we deduce from them the most natural inferences, we shall perhaps be able to illuminate this so interesting question of the introduction of the pendentive dome into French architecture of the 11 th and 12 th centuries. At the end of the 10 th century France was thus divided (1); we see in its middle part a great province, Aquitaine, Limoges being its central point; it is bordered on the North by the royal domain and by Anjou, which nearly follow the course of the Loire; at the W West and Southwest by the county of Toulouse; at the East by Lyonnais and Burgundy. Now in this vast province, and only in this province, French architecture adopted the dome on pendentives supported on transverse arches, during the course of the

This foreign impression is lost as one ascends the Rhone, or at least takes a different character in mingling with the oriental influence from the banks of the Rhine. That is different, because on the shores of the Mediterranean, the peoples had direct and constant relations with the East. In the 12 th century they received the influence of contemporary oriental arts, and not the archaeological influence of earlier arts, of that refinement and study found in the edifices of Provence dating from that epoch; but the Byzantine arts, that had left traces on the banks of the Rhine, date from the epoch of Charlemagne; since then the relations of these countries with the East had ceased to be direct. Thse two architectural styles, one of which formerly drew, and the other still drew from oriental sources, met on the upper Saone, on Burgundian soil a and in Champagne; from these mixtures of styles came the Romanesque of the South, from the contemporary southern oriental influence, and the traditional Rhenish oriental influence; h hench such great monuments as the churches of Tournus, abbeys of Vezelay, Cluny and Charlieu. And yet these mixtures form a harmonious whole, for these edifices were executed by men born on the soil, only subject to influences of whose origin they were ignorant, sometimes directed as at Cluny by foreigners not enough occupied with the details of execution to take a prominent part in the mode of building and decorating of m monuments. The oriental influence did not enter Gallo-Roman soil by these two ways alone. In 984 a vast church had been founded at Perigueux, exactly reproducing in its plan and arrangement a well known edifice, S. Mark of Venice, commenced a few years earlier. The abbey church of S. Front of Perigueux is a church with domes on pendentives, certainly erected under the direction of a Frenchman, that had studied S. Mark, or after the drawings of a Venetian architect, by Gallo-Roman workmen, for if the architecture of the monument be Venetian or quasi-oriental, the construction and the details of the ornamentation belong to the Roman decadence, and nowise recall the sculptures and mode of building applied to S. Mark of Wenice. This edifice, in spite of its foreign character at the epoch when erected and its entire difference from the edifices succeeding it in that part of Gaul, exerted a great influence on structures erected during the 11 th and 12 th centuries N

from the end of the 13 th century in the royal domain, is impressed with the true grandeur, that avoids exaggeration; it is always restrained, even it its errors and in periods of decadence,:within the limits of taste, severe and rich,at the same time, clear and logical, it bends to all requirements w without ever abandoning the style. It is an art belonging to instructed persons, who knew how to say and to do what is necessary to be understood. Let us not forget, that during the 12 th and 13 th centuries, the schools of Paris and the University were frequented by all men desiring to know true science, not alone in France but in Europe. The instruction in arts must be on the level of the instruction in letters, in what is called physics, i.e., the sciences, and theology. Germany, Italy and Provence in particular sent their doctors to perfect themselves at Paris. We have seen that the great religious establishments from the end of the 11 th century sent their monks to build monasteries in England, Italy and even to the l limits of Germany. At the end of the 12 th century the lay guilds in the royal domain commenced to take the direction of the arts in all the provinces of France. But before going farther, let us rapidly e?amine what were the various elements, that gave architecture in each country a local character. From Marseilles to Chalons the valleys of the Rhone and Saone have retained a great number of antique edifices nearly intact, a and there more than elsewhere Roman traditions left traces u until the 12 th century. The structures on the banks of the Rhone recall during the course of the 11 th and 12 th centuries the architecture of the late empire, the churches of Thor, Venasquez, Pernes, the porch of Notre Dame des-Dons at Avignon; Those of S. Trofhime od Arles and of S. Gilles reproduce in their details, if not in the entirety of their arrangement f for new needs, the Roman fragments that still cover the soil of Provence. But the frequent relations of the cities on the seashore with the East bring Byzantine elements into the ornamentation as well as in some general matters. The polygonal apses and the polygonal domes supported by a series of corbelled arches, the flat arcades decorating the walls, the slightly projecting moudings divided in numerous members, the delicate ornaments often presenting cominations foreign to the flora, sharp and serrate foliage, show their oriental origin.

M. Guizot. The govermental unity appeared, and under its influence architecture abandoned its old form, borrowed from all sides in order to place itself also under laws, that made of it a national art.

Philip August had added to the royal domain Normandy, Artois, Vermandois, Maine, Touraine, Anjou and Poitou, i.e., the richest provinces of France, and those containing the most active and industrious peoples. The monarchical predominance had gradually absorbed the influence of secular feudalism and of the great religious establishments in the provinces, and particularly in Ile-de-France. Under the shadow of that increasing power, the cities were better protected in their liberties, and had organized their administration with more security and power; some of them like Paris even had no need to form communes for developing their industries, but lived directly under the protection of the royal power, and that sufficed them. N Now it seems to us, that there has not been considered sufficiently this influence of the monarchical power on the arts in France. It seems that Francis I may have been the first king, who influenced the arts in France, while at the end of the 12 th century we see architecture and the arts dependent on it develop with incredible vigor in the royal domain, and especially in Ile-de-France, i.e., in the part of this domain, that remained the property of the king after the feudal division at the end of the 10 th century. From Philip August to Louis XIV, the general spirit of the monarchy presents a striking character; there is something impartial and grand, restrained and logical in the direction of affairs, which distinguishes this monarchy among all others in the history of the peoples of western Europe. The French monarchy is perhaps after the 12 th century the only one really national, that may be identified with the spirit of the people, and that has made its strength and its increasing power in spite of its faults and reverses. In its relations to the court of Rome, with its great vassals, with the nation itself, it always brings (we speak only of the entirety of its conduct) a moderation and intelligent spirit, that are the part of men of taste, to use a modern expression. This spirit of seeing things and in the conduct of affairs is found in the arts till Louis XIV. Architecture, that living expression of the spirit of a people,

studious youths, with no care but to instruct and to dispense knowledge and doctrine, saw arise the religious edifice, that in memory of the consolations he had found in his misfortune, he dedicated to the Paraclete or Consoler.[1] "Never had the efforts of a nation been more courageous and persistent for organizing a civil administration, to establish a nationality, than this outbreak of the communes. The high clergy condemned the teaching of Abelard, but placed itself on his level in m maintaining orthodoxy, aroused the movement of the crusades, and profited by it; not at first understanding and condemning the spirit of the communes, and yet soon found within these c civic corporations bold and active artists and skilful artizans, who would erect and decorate its churches, monasteries, hospitals and palaces. An Admirable epoch for the arts, full of sap and youth!

Note 1. p. 131. Gregoire VII, S. Francois d'Assisi et S. T Thomas d'Aquin. J. Delecluze. Vol. 2. p. 84, 85. -- Ouvrages inedits d'Abaillard. M. Cousin. p. 45 et seq.

Note 1. p. 132. Abaillard et Heloise. M. & MMe Guizot. 1853.

At the end of the 12 th century architecture was already p practised by lay artists, but retained something of its theocratic origin; although still comprised within Romanesque traditions, it took an unexpected character, that caused it to present what it would become fifty years later; it sometimes allowed to appear a singular boldness, experiments that would soon become principles. Each prowince erected vast edifices, that will serve as types; in the midst of these partial works, but which rapidly develop, the royal domain retains the first work. In the history of peoples, providence always places the men of the circumstances; Philip August then reigned; his skill in politics, his character both prudent and bold, elevate royalty to a degree of power unknown since Charlemagne. One of the first, that had known how to occupy his nobility in t truly national enterprises; feudalism in his reign lost the last vestiges of its conquering customs to become a part of the nation. Great numbers of cities and villages received charters willingly given; the high clergy took a smaller part in secular affairs, and reformed itself. The country finally constituted itself, and the royalty in fact was placed on the level of the royalty in law, according to the expression of

he commenced by introducing reforms among those he desired to make masters of the world; the spirit of S. Paul dwelt within him. Abelard represented all the resources of scholastics, t the subtilties of logic and the spirit of analysis carried to its last limits. It must be said that the latter expressed f far more the tendencies of his epoch than did S. Berhard; so the high clergy did not seek to destroy the dangerous arms of Abelard, but to use them; it took the arms of the learned doctor while retaining the orthodoxy of the saint. We shall insist on this point, because it clearly indicates in our opinion the movement produced in the study of the arts and sciences, and the conduct of the high clergy in relation to that movement; that comprised its importance and directed it to the great profit of the arts and civilization. All that arose at t that epoch is irressistible. The crusades, the thirst for k knowledge and the need of enfranchisement are so many torrents for which beds must be excavated; it seems that the West had long been sunk in torpor, and awoke filled with youth and health; it suddenly found itself filled with an expansive force, absorbing at the same time. Never had the desire to learn produced such marvels. When Abelard was condemned by a council, a fugitive despairing of human justice, found only a corner on the banks of the Ardisson, where he could teach freely with the consent of the bishop of Troyes, his solitude was soon p peopled by disciples. Let M. Guizot speak for a moment. "Scarcely had his disciples learned the place of his retreat, than they hastened from all sides, and along the river built for t themselves little huts around him. There lying on straw, living on coarse bread and wild plants, but happy in finding again their master, hungry for learning, they fed on his words, cultivated his fields and provided for his needs. Priests were mingled with laymen; "and those", said Heloise, "who lived by ecclesiastical benefices, and who were accustomed to receive and not to make offerings, had hands to take and not to give, they showed themselves almost importunate with the gifts they brought." It was soon necessary to enlarge the oratory, that had become too small for the number gathered there. The huts of reeds were succeeded by structures of stone and wood, all erected by the labors or at the cost of the philosophic colony; and Abelard in the midst of these affectionate and studi-

Boethius, and that the opinions of Plato had reached them. T The works of S. Anselm, while always impressed with the purity and humility of heart natural to him, still savor of the learned dialectician and metaphysician. Dialectics and logic had passed from the East to the West, and the philosophical methods of the Byzantine doctors had succeeded the great intellectual movement impressed by Charlemagne. Western theologians after the 11 th century employed in their writings or discussions all the resources of reason and logic to reach t the demonstration and the proof of the mysterious truths of religion. [1] No one is ignorant of the immense popularity acquired by Abelard in instruction during the 12 th century. That elevated and subtle intellect, credulous but leaning to rationalism, accustomed the youths of the schools of Paris to that scholastic scholarship, that rigor of reasoning, that infallibly led to doubt, minds not enlightened by a living faith. We shall again find that analytical spirit in all the works of art of the middle ages, and especially in the architecture that depends as much on the positive sciences as upon inspiration. S. Bernard felt the danger, he comprehended that this a arm of reasoning placed in the hands of youth, in times so n near barbarism, must strike a dangerous blow to the Catholic faith; so he did not hesitate to compare Abelard to Arius, P Pelagius and Nestorius. Abelard in 1122 was forced at the Council of Soissons to burn with his own hand his Introduction to Theology without its being heard, in which he proposed to defend the trinity and unity of God against the aeguments of the philosophers by submitting the dogma to all the resources of diaceltics; and in 1140 after censures by the Council of Sens, he was compelled to retire to the abbey of Cluny, where the two last years of his life were devoted to penitence. Still in spite of that condemnation, the art of dialectics became more and more familiar to the most orthodox writers, and from that school of scholastic theologians came in the 13 th century men like Roger Bacon, Albert the Great and S. Thomas Aquinas. S. Bernard and Abelard were the two heads of the two great principles that were found within the clergy during the course of the 12 th century; S. Bernard represented the pure faith and right sense; he firmly believed in theocracy as the sole means of escaping from barbarism, and as a sincere man

powerful motive of emelation and also the secular spirit. Centres like Cluny, when they sent their monkish cement-makers to build a priory in a place more or less distant from the m mother abbey, furnished them with decreed programmes, accepted recipes, patterns (if we may use the word), from which the clerical architects neither could nor would deviate. Architecture was then subjected to a theocratic organism, not only f forbidding new arrangements, but reproducing nearly everywhere the same forms without an attempt to advance. But when beside the clerical schools were established lay guilds, the latter were possessed by the innovating spirit, which belongs to modern civilization, soon carried this even into the spirit of the Catholic clergy, and to do this justice, it never rejected progress, wherever it came from, especially when this advance only tended to give more pomp and splendor to the cereconies of worship. The influence of the lay spirit was always slow to make itself felt in monastic structures, and that may be conceived, while it appeared suddenly in the edifices erected by bishops, such as cathedrals, bishop's palaces, feudal castles and municipal buildings. At that epoch the high clergy was too much enlightened, too much in contact with the powerful men of the age to not feel all the benefit to be derived from the innovating and bold genius that directed lay architects; it took possession of this with that knowledge of matters of the time, that characterized it, and became its most powerful promoter.

Note 2. p. 129. Hist. des Com. de France, etc.

In the 12 th century the clergy did not have to take spiritual arms alone against the spirit of disorder of the great a and their excesses, but there was formed besides it a rival instruction, claiming to be as orthodox as itself, but desiring at the same time to base itself on rationalism. We have already stated that the select minds took refuge in those great religious establishments, where they studied, commented on, and reviewed with care the manuscripts of the pagan authors, the Fathers, or the Christian philosophers collected in the libraries of the monasteries; it is difficult to know whether men like Lanfranc and S. Anselm could read the Greek authors, but it is certain, that they were acquainted with the translations and the commentarise on Aristotle attributed to

used in the ordinances from the year 1226. Consequently their officials recognized, that they held their from the king, not by feudal right and as a noble, but by right of sovereignty and as king." [1]

Note 1. p. 129. Hist. des Com. de France. By Baron C.F.E. Dupin. Paris. 1834.

This procedure did not have the regularity of a system perseveringly followed. Many nobles desired to take by force these charters sold in a moment of distress, but the royal intervention leaned to the side of the communes, for these institutions could only weaken the power of the great vassals. The struggle between the clergy and the feudal nobility continued always, and the secular nobles frequently established communes with the sole purpose of hampering the power of the bishops. All the powers of the State in the 12 th century then t tended to revive this popular predominance of the country, s suppressed for several centuries. With the knowledge of its strength, the common people renewed the feeling of its dignity, it alone still retained the traditions and certain methods of Roman admisintration; "charters of communes from the 12 th and 13 th centuries seemed to be only a confirmation of existing prilileges." [2] Some cities in the South under the influence of a feudal organism less subdivided and therefore more liberal, such as Toulouse, Bordeaux, Perigueux and Marseilles, had retained almost intact their municipal institutions; the rich and populous cities of Flanders were mostly entranchised after the 10 th century. The spirit of order is always the result of the labor and the wealth acquired by industry and commerce. It is interesting to see in contrast the anarchy of the feudal system, these growing organizations of communes, a sort of little republics, that possess their administrative machinery, imperfect and rude at first, then already during the 13 th c century presenting all the guaranties of actual constitutions. The arts, like commerce and industry, developed rapidly in t these centuries of comparative libertyl the guilds of trades collected all the capable men, and what later became an oppressive monopoly was then a centre of light. The influence of monastil establishments in the art of architecture could only be opposed by guilds of trades, that presented all guarantees of order and discipline found in the monasteries with the pow-

rushing to the East, in the conquest of the holy places, it obeyed two sentiments, first the religious feeling and the n-need of novelty, to withdraw from incessant local contests, from the monotony of an isolated, hard, even needy life; most possessors of fiefs left behind them a multitude of creditors, mortgaging their property to set out for the holy land, and counting on the unforeseen to escape from difficulties of all kinds, that accumulated around them. It is unnecessary to st-ate that kings, clergy, and the people of the cities found certain advantages in these emigrations in a body of the nob-le class; the kings could thus more easily extend their powers, the religious establishments and bishops were rielieved of t their turbulent neighbors, at least temporarily, or seeing t them return without anything, they increased the property of the Church, and could think with greater security on improv-ing and using them; the people of the cities obtained charters for money when supplying the nobles with sums necessary for these distant expeditions, for ransom if they were made pris-oners, or their support if they returned ruined, which freque-ntly occurred. These transactions were made willingly or by force, and resulted in daily weakening the distinctions of r race, of conquerors and vanquished, of Franks and Gallo-Romans. They contributed to form a nationality connected by common in-terests, by agreements between both parties. The royal power abandoned the position of chief of a caste of conquerors to become a national royalty intended to protect all classes of citizens without distinction of race or condition. It commen-ced to act directly toward the people without intermediates, not only in the royal domain, but in the midst of the posses-ions of the great vassals. "A noble that gave or sold a char-ter to a commune required an oath of fidelity from the inhabi-tants; on his part he swore to maintain their liberties and franchises; several nobles guaranteed his faith, obligating themselves to place themselves in the hands of the inhabitan-ts, if their liege lord violated any of their rights, and to remain prisoners until he had done justice to them. The king always intervened in these treaties to confirm and guarantee the charters. A commune could not be made without his consent, and all the cities with communes were reputed to be in the l lordship of the king; he called them his good cities, a title

indecision in art, that moderated and repressed the dash of t the monastic, schools. The genius of the Gallo-Roman people was opposed to the reform, that S. Bernard desired to establish, so they did not take it into consideration; and this reform which arrested for a moment the impulse given to architecture in the midst of the great religious establishments, and only opened the way into a new course, which henceforth should pertain to lay corporations. From the end of the 12 th century, architecture, religious, monastic or secular, called to its aid all the resources of sculpture and painting, and the establishments founded by S. Bernard remained as isolated evidences of the protests of a single man against the taste of the nation.

Note 1. p. 127. Lettres sur l'Histoire de France. Aug. Thierry. p. 412. Paris. 1842. -- Hug. Pict. Hist. Vezelias. Mon. Book 3, in D. Achery. Spicilegium. Vol. 2. p. 533, 535.

In the organization of the lay guilds of trades, the communes did not always follow the example given by the religious establishments. The great abbeys and even the great priories after the 8 th century had established around their cloisters and in the circuit of their domains workshops of tanners, carpenters, joiners, smiths, makers of cements, goldsmiths, sculptors, painters, copyists, etc. (Arts. Architecture Monastique). Although these shops were composed of clerics and laymen without distinction, they were subject to discipline, and the w work was systematic; by apprenticeship was imparted instruction; thus each religious establishment represented a real state on a small scale, containing in itself all its means of existence , chiefs, farmers and industries, actually dependent only on its own government under the supremacy of the sovereign p pontiff. This example was to the profit of the commune, who desired order and independence at the same time. In changing the centre, the arts and industries did not abruptly change direction; and if workshops were formed outside the circuit of the monasteries, they were organized on the same principles, the secular spirit only brought to them a new element, very active certainly, but proceeding in the same means by associates and a sort of fellowship.

Parallel to the great movement of enfranchisement of cities, a revolution was prepared within the secular feudalism. In r

promising them to recognize the commune, entering there himself and swearing fidelity to the citizens.

Note 1. p. 126. Lettres sur l'Histoire de France. Aug. Thierry. p. 401, 402. Paris. 1842.

The inhabitants of Vezelay were no sooner enfranchised and formed into a commune, than they fortified themselves. "They erected around their houses walls with battlements, each according to his wealth, here the mark and guarantee of liberty. O One of the more prominent among them named Simon, laid the f- foundations of a great square tower." [1] A few years before or after that epoch, mans, Cambrai, S. Quentin, Laon, Amiens, Be Beauvais, Soissons, Orleans, Sens and Pheims formed communes, some with arms and violence, others profiting by quarrels arising between the nobles and bishops, that each on their own part possessed feudal rights over these cities. The character of the indigenous Gallo-Roman population, long suppressed, s suddenly rose; the peoples did not overthrow as in our time a and together whoever restricted their liberty, but they made partial and isolated efforts, thus manifesting their spirit of independence with as much energy as they were allowed. That epoch of enfranchisement of the commune marks an important p place in the history of architecture. This was a blow to the feudal secular or religious influence. (Art. Architecte). From this moment the great religious centres ceased to possess exclusively the domain of the arts. S. Bernard must himself aid in hastening the accomplishment of this revolution; abbot of Clairvaux, he belonged to the austere rule of Citeaux (Cistersian); several times in the pulpit, notably in that church of Vezelay that depended on Cluny, he was aroused by the passion of an ardent conviction against the luxury then displayed in the churches, against these "eccentric and monstrous figures," that in his eyes had nothing Christian, that were lavished on capitals, friezes, and even in the sanctuary of the Lord. The monasteries erected under his inspiration, impressed with a severity of style little common then, deprived of ornaments and reliefs, contrasted with the excessive richness of the abbeys subject to the rule of Cluny. The influence of these a austere structures withered all that arose around them.(Art. Architecture Monastique). This deviation of religious architecture produced in the course of the 12 th century a sort of

These two movements are distinct however, and if they proc-eed parallel, they are entirely independent of each other. T The clerics who then taught in professorships in the midsl of youths desirous to learn what was then called physics and th-eology, were the first to term execrable the attempts of cit-ies for liberty. Just as the citizens, who demanded and obta-ined if necessary by force franchises destined to protect the liberty of commerce and industry, pursued to stone the disci-ples of Abelard. Such is that epoch of childhood, the strange contradictions, in which all classes of society seem to conv-erge toward unity by mysterious ways, accusing each other of errors without perceiving,that they advance toward the same end.

Among the abbeys placed in dependence on Cluny, and that p possessed the same prilileges, was the abbey of Vezelay. To-ward 1119, the counts of Nevers claimed rights of lordship o over the city dependent on the monastery. "They could not see without envy the great profits derived by the abbot of Vezelay from the multitude of strangers of every rank and trade, as well as from the fairs held in the city, particularly on the east of S. Maria Madeline. That fair attracted during several days a numerous assemblage of merchants from the kingdom of France or the communes of the South, and gave the city some thousands of souls an importance nearly equal to that of the great cities of the time. Although serfs of the abbey of S. Maria, the inhabitants of Vezelay had gradually acquired the ownership of several domains situated in the vicinity; and their servitude diminished by the natural course of affairs, so that it was gradually reduced to the payment of taxes and aids, to the obligation of bringing their bread, wheat and g grapes to the oven, mill and public press, maintained and es-tablished by the abbey. A long dispute, often appeased by the intervention of the Popes, but always renewed under various pretexts, thus arose between the counts of Nevers and the ab-bots of S. Maria of Vezelay. Count William, several times sum-moned by pontifical authorities to renounce his pretinsions, pushed them with more tenacity than ever, and when dying left to his son of the same name as himself his enmity to the abb-ey."[1] The count on his return from the crusade again commen-ced the struggle by an alliance with the inhabitants, promis-

part of western Europe; but the simple parish churches, rural structures, public monuments of cities, took their models in these centres of wealth and light. There indeed, and there a lone is found comfort, arrangements carefully studied and foreseen, sanitary and dignified. In 1009, even before the erection of the abbey of Cluny under Peter the Venerable, "Hugues of Farfa sent one of his disciples named John to see the places and to describe for the special use of his monastery the uses and customs of Cluny. That work remained in manuscript in the Vatican library, No. 6808,[2] and contains data that we cannot find elsewhere today. No doubt that these dimensions, that it was desired to take to Forfa, were those of Cluny in the time of S. Odilon. When we should be in error in this respect, indeed it is always certain that these proportions were furnished, and these plans were made at Cluny, whose glorious influence surprises us, even in the heart of Italy. The church must have 140 ft. length, 160 glazed windows, two towers at the entrance, forming a place for the laity:- the dorimtory 140 ft. long, 34 ft. high, 92 glazed windows, each having 6 ft. height and 2.5 ft. width; the refectory 90 ft. long and 23 ft. high; the almonry 60 ft. long; the workshop of the glaziers, jewellers and goldsmiths, 125 ft. long by 25 ft. wide;[3] the stables for horses of the monastery and of strangers, 280 ft. long by 25 ft."

Note 2. p. 125. Ann. Bened. Vol. 4. p. 207, 208.

Note 3. p. 125. See Latin text.

Note 4. p. 125. Cluny ou XI siecle. By Abbe Cucherat. p.106.

But while the religious orders and bishops, who did not admit the vassalage of the Church, and the sovereign pontiff at their head, supported unitedly and with persistence the struggle against the great feudal powers, desiring to establish a spiritual unity, and to reform the abuses introduced among the clergy; the people of the cities profited by the intelligence and the moral independence disseminated around the great monasteries, experienced the need of a public authority and an i internal administration in imitation of the unique authority of the sacred chair, and of the internal organization of the monasteries; they claimed their portion of the guarantee against the personal power of the secular feudalism and of the high clergy.

evenings the defective manuscripts of the pagan authors, the sacred Scriptures, or the Fathers. At Cluny the greatest attention was paid to instruction. Udalric [1] devoted two chapters of his"Coutoumes"to detailing the duties of masters to children or the adults entrusted to them. [2] The greatest prince was not educated with more care in the palace of the king, than the smallest of the children at Cluny. [3]

Note 1. p. 124. Udol. Antiq. cons. Clun. mon. Book 3, ch. 8, 9.

Note 2. p. 124. Cluny au 11e siecle, by Abbe F. Cucherot.

Note 3. Udol. Antiq. cons. Clun. mon. Book 2, ch. 8. -- Bern-cons. coen. Clun. p. 1. ch. 27. -- Abbe Cucherot, p. 83.

These communities thenceforth assume great importance in c contrast to the population of the cities by their resistance to the blind despots of feudalism and its spirit of disorder, participating in all public affairs by the intelligence, knowledge and capacities of their members; just as one of the most profound and elegant writers of our time said in an excellent work recently published:-[4] "The abbots of this time of austerity and of disorder very strongly resemble those idlers largely endowed, later jeered at by our common and saterical literature; their administration was laborious, and the crosier of the shepherd did not remain immovable always in their hands." This internal and external activity of the monastery must, as always, give to the arts and especially to architecture a great impulse; and it was within the abbeys themselves, that w were found the masters, who in the 11 th century gave them a material importance equal to their religious and moral predominance in Christianity. The first architect who laid the foundations of this vast and admirable monastery of Cluny, almost entirely destroyed today, was a Cluniac named Gazon, former a abbot of Baume. [1] He who finished the great church was a Flemish monk Hezelon, who taught at Liege before his entrance at Cluny, the kings of Spain and England supplied the funds required for the completion of that great structure. (Art. Architecture Monastique).

Note 4. p. 123. S. Ans. de Cont. by M. C. de Remusat. Paris. 1853. p. 43.

Note 1. p. 125. Abbe Cucherot. p. 406, 407.

Not only did these grand buildings serve as types for all the monasteries of the rule of Cluny in France and in a great

must be said that the Church lessened the contest by a reform within itself.

Note 1. p. 123. Mob. Ann. Ben. Vol. 3. p. 330.

In 909 William, duke of Aquitaine, founded the abbey of Cluny, and he gave to Ss. Peter and Paul all the property accompanying its foundation. [2] A bull of John XI (March, 932) confirms the charter of William, and"frees the monastery from all dependence on any king, bishop or court whatever, and even the relatives of William."[3]

Note 2. p. 123. Bibl. Cluny. Cols. 1, 2, 3, 4. -- Cluny ou XI siecle by Abbe F. Gucherat. 1850. Paris.

Note 3. p. 123. Bull. Cluny. p. 1, 2, 3. The same.

It is unnecessary to judge of that intervention of the Roman pontiffs with our modern ideas. It is necessary to think that in the midst of this general anarchy, of this overlapping of all powers, that merely oppression of brutal force, that overlordship accepted by the chair of S. Peter, it must oppose an invincible barrier to material force, establish spiritual unity, an immense power in the heart of barbarism, and that is what occurred. The entire 11 th century and the first half of the 12 th are filled by the history of these struggles, f from which the spiritual power always came off conqueror. S. Anselm, archbishop of Canterbury, S. Hugues, Abbot of Cluny, and Gregory VII, are the three great figures that dominate t that epoch, and that establish permanently the spiritual independence of the clergy. As one must think, the peoples were not indifferent to these great debates; they saw then a safe refuge from oppression in these monasteries in which were concentrated the intelligent men, the best minds, who by the sole power that gives profound conviction, a regular and devoted life, checked all the great personages of the century. Opinion, to use a modern word, was in their favor and was not their least support; the regular clergy summed in itself all the h hopes of the lower class; one therefore should not be surprised if during the 11 th century and the beginning of the 12 th, it became the centre of all influence, progress and knowledge. Everywhere were founded schools in which were taught letters, philosophy, theology, the sciences and arts. At the abbey of Bec, Lanfranc and S. Anselm being priors did not disdain to instruct the secular youths, to correct in their eve-

of these daily ruins, since it advances only by practice. Yet this obscure work of the cloister woulh sometimes be productive.

Development of Architecture in France from 11 th to 16 th centuries. -- Causes of its Progress and Decadence. -- Different Styles peculiar to each Province.

The 11 th century commences a new era for acts as well as politics. We have stated before, that letters, scieuces and arts were inclosed within the cloisters after the reign of C Charlemagne. In the 11 th century the feudal system was organized as far as it could be, the territory divided into fiefs, vassals of each other up to the sovereign, presenting the appearance of an arena in which everyone defended his rights if attacked, or conquered new ones by arms. The written organization of the feudal system was perhaps the only suitable one in that time so near barbarism, but altually the application corresponded little to the principles. It was a permanent civil war, an unbroken series of oppression and vengeance of n nobles with nobles, of revolts against the rights of the superior. In the midst of this perpetual conflict, what was the state of the people in the country! The monastic institutions, exhausted or discouraged, in that time when none seemed to k know justice or injustice, when the must brutal passions were the only laws obeyed, was itself in the most deplorable condition, monasteries pillaged and burnt by the Normans, held to ransom by secular nobles, possessed by lay abbots, for the m most part depopulated, their regular life singularly relaxed. In the midst of monasteries are seen canons and nuns, lay abbots living there with their wives, children and hounds. [1] S Still some religious establishments yet retained the traditions of the Benedictine life. At the beginning of the 11 th c century, not only feudal rights were exercised by lay nobles but also by bishops and abbots; in thus losing its character of purely spiritual power, a portion of the high clergy authorized the influence, that the secular feudalism claimed to exert on the elections of these bishops and abbots, since these became vassals subject to the laws of the feudal organism; thus commenced a struggle in which the two spiritual and temporal principles found themselves engaged, in which it concerned either the liberty or the vassalage of the Church, and it

borrowed from Roman traditions by Charlemagne was able to arrest disorder without destroying its causes. But we have seen how that prince scattered the elements of knowledge in entire barbarism. During that long reign, the seeds had time to put forth roots so strong, that it was no longer possible to tear them up. The clergy was made the depositary of all intellectual and practical knowledge. Let us return in thought to the 9 th century, and examine for an instant what was then the ground of Gaul and of a great part of western Europe. Feudalism was increasing but not organized, war, country covered by waste forests, scarcely cultivated in the vicinity of cities. The urban people were without industries or commerce, subject to a decrepit municipal organization, not connected with each other, inhabited by colonists or serfs, whose condition was nearly the same, the empire divided and rent by the successors of Charlemagne and the possessors of fiefs. Everywhere brutal and improvident violence. In the midst of this disorder, one class of men is not held to take arms or to labor on the land, and it possessed a notable part of the soil; it alone has the privilege of occupying itself with intellectual matters, learning and knowledge; it is moved by an admirable spirit of patience and charity; it soon acquires thereby even a moral strength against which break uselessly all the material and blind forces. Within this class, in the shelter of the walls of the cloister take refuge all elevated, refined and thoughtful minds, and a singular thing, this will soon be among these m men outside the age, that this will come to seek light. But until the 11 th century this work is obscure and slow; it seems that religious establishments and the clergy are occupied in collecting the elements of a future civilization. Nothing is established or definite, the daily struggles against barbarism absorb the entire attention of the clerical power, it even appears exhausted by this war in detail. The arts feel this uncertain state, they are seen to pass painfully along the path traced by Charlemagne without much advance; the Roman renaissance remains stationary, produces no fruitful idea, new or bold, and with some exceptions to be considered, architecture remains enveloped in its old antique shroud. The Norman invasions further render more miserable the condition of the country; and how could architecture develop in the midst

on the architecture; just as each noble shuts himself within his domain, as each diocese is isolated from the adjacent diocese, the art of building follows step by step,this new political organization. Constructors do not go afar to seek precious materials, no longer use the same recipes, but labor on their own soil, employ the materials at their command, modify their procedure according to the climate in which theylive, or they submit these to entirely local influences. A single bond, the papacy, still unites all these works executed in i isolation. The episcopate, that had greatly contributed to the partition of the temporal power in order to reconquer the spiritual power, itself subject to the court of Rome, caused all these various ways to converge toward one aim, in which they should meet at some time. It will be understood how much these isolated labors must fertilize the arts, and what an immense development architecture would take after so many separate efforts, when unity of government returning in the 13 th century should unite again in its hands all these minds, made pliant by long practice and by conquered difficulties.

Among the arts, architecture is certainly the one with most affinity with the instincts, ideas, customs, progress and needs of a people; it is then difficult to take into account t the direction it takes and the results attained, if one does not know the tendencies and the genius of the peoples in the midst of which it is developed. From the 17 th century the p persnality of the people in France has always been absorbed by the government, the arts have become official, ceasing to react strongly in their domain, like politics in its own at certain epochs. But in the 12 th century in the midst of that divided society it war not so, where the despotism of the great without unity was equivalent, morally speaking, to a liberty approaching license. The narrow limits within which we are restricted do not allow us to review the political historw and that of architecture from the 8 th to the 12 centuries in France; yet it is necessary to attempt this if one desires to explain the progress of this art in still barbarous centuries of the middle ages; we must limit ourselves to indicating prominent general points, that will be landmarks on the path to follow.

As we have stated, the political and administrative system

he profited to attain the principal aim of his reign, education. Finally, he found in Spain more to take than to give.

Without being too positive, we believe then that the reign of Charlemagne may be regarded as the introduction of modern arts into France; to explain our thought by an illustration, we shall say that after that reign, if the cut and shape of the clothing remained Roman, the material is oriental. It is more particularly in the countries near the seat of the empire and in which Charlemagne made long sojourns, that oriental i influence made itself felt; on the banks of the Rhone, in Languedoc, along the Pyrenees, that was long retained until the 13 th century the tradition of certain forms, evidently important and foreign to Roman art.

But in spite of his firmly established administrative system, Charlemagne was unable to introduce equally everywhere t the instruction in the arts and sciences, to which he devoted such great care. Even admitting that he could by the sole power of his persistent genius (that is difficult for us to appreciate todaysince.examples are wanting), give to architecture from the banks of the Rhine to the Pyrenees an unnatural unity in spite of the differences of nationality, this grand work must collapse after him. Charlemagne in fact had combined in his person the spiritual and imperial powers; he acted to preserve civilization, and the sovereign pontiffs, who had seen the Church preserved by the emperor from attacks by Arabs, G Greeks and Lombards, could recognize this unity of powers. B But the emperor died, those nationalities of different origins united by the power of the genius of a single man must separate again; the clergy must gradually recover the spiritual p power, that then the successors of Charlemagne assumed for t themselves, no longer to preserve but to destroy all liberty in the Church, and to traffic in ecclesiastical property and dignities. The germs of feudalism, that existed in the spirit of the Franks, also contributed to separate this combination so laboriously bound together by this great prince. Fifty years after his death each people resumed its natural conduct; the art of architecture was divided, the particular genius of each country is represented in its monuments of the 9 th and 10 th centuries. During the 11 th and 12 th centuries, the d differences are marked still more. The feudal system reacts

Syria or Spain; for we can judge by the few monuments in Rome dating from that epoch, into what degree of ignorance the constructors had fallen in the capital of the Christian world.

But for Charlemagne all must come from Rome by tradition, he was before all the emperor of the West, and he must not a allow it to be believed, that the light could come from elsewhere. Thus with the Roman renaissance that he desired to produce, by the force of things were mingled foreign elements, that soon caused the arts to deviate from the path on which he wished to replace them. The emperor could adopt the traditions of the Roman government, make the ordinances entirely R Roman, form an administration copied from the Roman administration, but powerful as one is, he cannot decree an art. To teach drawing to his painters, mathematics to his architects, it was necessary to bring professors from Byzantium, Damascus or Cordova; and these exotic seeds soon in the West among the peoples, that had their own genius, must produce an art neither Roman nor oriental, but which was derived from these two origins, and must produce such a new and living trunk, that after some centuries it extended its branches even over the countries from which its germs had been drawn.

It has been repeated to satiety, that the crusades had a g great influence on western architecture; that is a belief that the study of the monuments rather destroys than confirms. If the arts and sciences preserved and cultivated by the Moors cast new elements into western architecture, this was rather during the 8 th century. Charlemagne must have been struck by the means employed by the infidels to govern and police their peoples. Already in his time the disciples of Mahomet had established famous schools, where all the sciences then known were taught; these schools were mostly placed under the shadow of the mosque, and could furnish him with models for his establishments, both religious and teaching. Further, this i idea showed its Greek origin, and the Nestorians might have transmitted it to the Arabs; however Charlemagne had more direct relations with the infidels than with the Byzantine court, and he respected the Mahometans more than the Saxons, for example, constantly attacked by him until their complete conversion, because he found among the Moors a very advanced civilization, refined manners, orderly customs, and wisdom by which

before them the sons or grandsons of their companions in arms, and then attack and pillage their villas. Then these were succeeded by walls and deep ditches, but being badly placed for defense, the villas are soon abandoned to the colonists, and the Frankish chiefs establish themselves in the fortresses. In the midst of that fortified anarchy, that the last Merovingian kings were unable to suppress, the bishops and religious establishments struggled alone; some with patience, the power of a principle supported with firmness, and their exhortations; others by study, by agricultural labors, collecting behind t their walls the last remains of their civilization.

Charlemagne arose in the midst of that chaos; he succeeded by the power of his organizing genius in establishing a sort of administrative unity; he recovered the broken thread of antique civilization and endeavored to tie it again. Charlemagne desired to produce a renaissance. Modern arts profit by t that supreme effort, not in following the path traced by that great genius, but in appropriating the new elements, that he had sought in the East. Charlemagne understood that the laws and material force are powerless to reform and organize ignorant and barbarous peoples, unless one begins by enlightening them. He comprehended that arts and letters are one of the m most efficaceous means to oppose to barbarism. But in the West the instruments were lacking to him, for long since the last rays of antique arts had vanished. The empire of the East, w which had not been overturned by the invasion of savage peoples, retained its arts and industries. In the 8 th century t there was it necessary to seek the practice of the arts. Besides, Charlemagne had had frequent disputes with the emperors of the East, but had maintained a good understanding with the caliph Haroun, who ceded to him in 801 the holy places. After 777 Charlemagne had made a treaty of alliance with the Moorish governments of Saragossa and of Huesca. By these alliances he arranged the means of collecting the sciences and arts where they were developed. From that epoch the Moors of Spain, like the Arabs of Syria, were very advanced in the mathematical s sciences and in the practice of all the arts, and although C Charlemagne is said to have brought from Rome in 787 grammarians, musicians and mathematicians into France, it is probable that he requested professors of geometry from his allies in

There the French kings held their courts, gave themselves up to the pleasure of the chase, and lived on the products of t the soil collected in vast storehouses. When these provisions were consumed, they changed their residences. The residence structure was decorated with a certain elegance, although very simple in construction and arrangement. Vast porticos, stables, spacious courts, some great covered spaces in which were convoked synods of bishops, where the Frankish kings presided o over these great assemblies, followed by the traditional festivals, which degenerated into orgies, composed the residence of the chief. "Around the principal building was arranged in order the lodgings of the officers of the palace, whether barbarians or Romans by origin. Other houses of inferior appearance were occupied by a great number of families, that both men and women practised all sorts of trades from goldsmith's work and the making of arms, to the trades of weaving and tanning. [1.]

Note 1. p. 118. Aug. Thierry. Recits de temps Merovingiens. Vol. 1. p. 250. Edit. Of Furne. Paris. 1848.

During the Merovingian period the cities alone were fortified. The villas were open, only defended by palisades and ditches. Under the kings of the first race feudalism did not yet exist, vassals were merely great proprietors established on Gallo-Roman soil, subject to a central authority , that of the Frankish chief, but an authority that became weaker as the m memory of the conquest and of the common life of the camp were lost. The new possessors of the lands, distant from each other, separated by forests and waste lands desolated by war, could extend at their ease, without foreign attacks to repulse, and having no need for trespassiug on the property of their neighbors. But these men accustomed to an adventurous life, to pillage, the most lawless brigandage, could not suddenly become quiet proprietors contenting themselves with their portion of the conquest; as much from idleness as from love of gain, they attacked the religious establishments and the open villages for the little they found to take. Thus one sees the monasteries and the Gallo-Roman communities gradually leave the plains, the courses of the rivers, to take refuge on elevated points, and to fortify themselves there. The level country is abandoned to the career of the possessors of the soil, who only find

translation of his description. "He caused (S. Numatius) the building of the church that still exists, and which is the m most ancient of those to be seen in the interior of the city. It is 150 ft. long, 60 ft. wide and 50 ft. high in the interior of the nave to the framework; in front is an apse of round form, and on each side extend aisles of elegant construction. The entire edifice is arranged in the form of a cross; it has 42 windows, 70 columns and 8 doors. The walls of the nave are decorated by several species of marble fitted together. The entire edifice having been completed in the space of 12 years." [1] That is an antique basilica with its columns and side aisles, its attic that we believe must be translated by carpentry, with as many more reasons that this church was entirely destroyed by fire, when Pepin took the city of Clermont from duke Eudés of Aquitaine, to that point that it was necessary to rebuild it entirely. In other passages of his History, Gregory of Tours speaks of certain princely habitations, whose porticos were covered by woodwork ornamented by animated paintings.

Note 1. p. 117. Hist. ecbles. des Francs. G. F. Gregoire, bishop of Tours, etc. Vol. 1. p. 178. Paris. 1836.

The new masters of Gaul preferably established themselves in the midst of the lands assigned to them; they found there a number of colonists and slaves accustomed to working the l land, a source of revenue in kind easily collected, and which should satisfy all the wishes of a German chief. Besides, the cities had still retained their municipal government, respected in great part by the barbarians. These remains of an old civilization could only incommode the newcomers, however strong they were. Foreign conquerors do not like to find themselves in presence of a population, very submissive, but which is superior to them in regard to manners and civilization, at least a moral constraint embarrasses men accustomed to an independent and wild life. Violent exercises like the chase and war; orgies for relaxation, adapting themselves to a rural l life. So under the primary race, villas are the preferred residences of kings and owners of the soil. These conquerors and conquered lived together. These habitations are composed of a series of buildings intended for farming, scattered in the c country, quite resembling our great agricultural establishments.

Origins of French Architecture.

When the barbarians invaded Gaul, the ground was covered by Roman monuments, that the indigenous peoples had long been adapted to Roman life, so that it required three centuries of disasters to produce forgetfulness of antique traditions. In the 16 th century there yet existed in the midst of the Gallo-Roman cities a great number of edifices spared by devastation and fire; but the arts no longer had a single representative, when the barbarians definitely established themselves on the soil, no one could state how the Roman monuments had been erected. Examples were still standing, but like enigmas to be solved by the new peoples. All that concerns daily life, the government of the city, language, had still survived the disaster; but the art of architecture requires study, time, quiet for production, and had necessarily fallen into oblivion. The few fragments of architecture, that remain to us from the 6 th and 7 th centuries are only pale reflections of Roman art, o often rubbish piled up good or bad by unskilful workmen scarcely knowing how to set rubble and bricks. No special character distinguishes these formless structures, which rather give the idea of the decadence of a people than of its infancy. Indeed what art elements could the Franks have cast into the midst of that Gallo-Roman population? We tnen see the clergy establish themselves in basilicas or temples left standing, kings inhabit baths, ruins of palaces or of Roman villas. If when the hurricane of barbarism has passed, when the new masters of the soil began to establish themselves, churches and palaces are built, Roman types are reproduced, but avoiding an attack on the difficulties of the art of building. For churches the antique basilica always serves as model; for princely habitations, it is sought to imitate the Gallo-roman villa. Gregory of Tours describes in a quite vague manner some of these religious or secular edifices.

Yet it is unnecessary to believe, that all idea of luxury was excluded from architecture; on the contrary edifices, most frequently erected in a barbaric fashion, were internally covered by paintings, marbles anf mosaics. The same author, Gregory of Tours, speaking of the church of Clermont-Ferrand built in the 5 th century by S. Numatius, eighth bishop of that diocese, makes a stately description of that edifice. Here is the

of Semur represents an architect that we give here. (1).

One of the miniatures of a manuscript of Matthieu Paris marked Neron. D. I. (Cotton Library), 13 th century, represents offa, son of Warmund, king of eastern England, causing to be built the celebrated abbey of S. Albans on his return from R Rome. Offa gives orders to the master of the work, who holds a great compass of a stonecutter and a square; workmen that the master indicates with a finger are occupied with the construction (2). This great compass causes the assumption, that the architect traces his full size diagrams on the floor; it could not be otherwise, both to save time and to be certain of the accuracy of the drawing, since again today it is impossible to erect a structure in the pointed style, unless one draws the diagrams himself. Let us not forget, that all stones were cut and finished on the yard before being set, and that it was therefore necessary to apply the greatest accuracy and most complete study in tracing the diagrams. (Arts. Appareil, Epure, Trace).

ARCHITECTURE. Architecture.

Art of building. Architecture consists of two elements, theory and practice; theory comprises art, properly so-called, rules inspired by taste based on traditions, and science that can be demonstrated by invariable and absolute formulas. Practice is the application of theory to requirements; practice applies art and science to the nature of the materials, climate, customs of an epoch, the needs of the moment. Taking architecture at the origin of a civilization, that succeeds another, it is necessary to take into account the traditions on one hand, the new arrangements on the other. We shall divide this Article into several parts the first will comprise a brief history of the origin of mediaeval architecture in France; the second will treat the development of architectura from t the 11 th to the 16 th centuries, of causes that produced its advance and its decadence, the different styles peculiar to each province; the third will comprise religious architecture; the fourth monastic architecture; the fifth secular architecture' the sixth military architecture.

ORIGINES DE L'ARCHITECTURE FRANCAISE.

monasteries and palaces. Particularly in north France are recruited the artists to erect edifices in the "new"taste. Lay schools of architecture must exist in Ile-de-France, Normandy, Burgundy, in Belgium and on the banks of the Rhine. But the means of instruction probably were only apprenticeships with masters, what we call studios today. The impulse given to architecture at the end of the 12 th century and the beginning of the 13 th was the work of some men, for architecture at that epoch is impressed by an individual character, that does not exclude unity. Gradually that individuality is effaced, and one sees that rules are established, based on examples a adopted as types; characteristics are difined by provinces; methods are composed, and art finally becomes classic, to speak properly, and advances in this traced path with a monotony of forms, something foreseen in the combinations, that must necessarily bring to a people endowed with a vivid imagination and desiring novelty, the aberrations and tricks of the 15 th century. When the arts have reached this point, the executive masters of conception of the entirety, and the hand that shapes,ends by stifling the genius that conceives. At the end of the 15 th century, architects lost in the problems of geometry and the refinements of construction, surrounded by an army of skilful artizans, forming a part of powerful guilds, that also had their consecrated types, methods, and a high opinion of their merits, were no longer sufficiently strong to direct or resist, and must yield.

We have given some examples of inscriptions ostensibly traced on the edifices of the 13 th century, and intended to perpetuate the names of the architects that erected them, not w without a certain feeling of pride. Also sometimes the sculpture is required to represent the master of the work. On capitals, in some corners of portals, in stained glass windows, is found the architect with compass and square in hand, always clad in lay costume, head bare or with a sort of hood very m much used among the different trades employed on buildings. On one of the tympanums of the backs of the stalls of the cathedral of Poitiers dating from the 13 th century may be seen an architect seated before a tablet and holding a compass; t this pretty relief was engraved in the Annales archaeoligiques. One of the bosses of the vault of the side aisle of the church

epoch present faults in proportion and harmony, which justly caused the rejection of the confused heap of constructions by the architects of the Renaissance. It is perfectly understood, that men of sense and order like Philibert Delorme, for example, who practised his art with dignity, and who did not conceive that even a hut could be built without unity of direction, should regard as barbarous the method employed at the end of the Gothic period, when it was desired to erect an edifice. We have in our hands some projects drawn up at the end of the 15 th and beginning of the 16 th centuries, in which that spirit of anarchy is found in every line. The chapter of Rheims, after the fire that in the reign of Louis XI destroyed the entire carpentry of the cathedral and a part of the upper masonry, desired to repair the injuries. It called before it each trade; masons, carpenters, plumbers, locksmiths, and demanded from each its opinion, adopted separately each proposal. (Art. Devis). We see today the monstrous results of that disorder. These restorations were badly made without connection together, out of proportion to the old structures, and these separate works placed beside each other, destroyed the beautiful harmony of that admirable church, compromising its durability. Indeed the carpenter was occupied with the idea of making some masterpiece, and cared little whether his carpentry was in accord with the masonry on which he placed it. The plumber came, who arranged the removal of the water according to his project, without caring if it found its natural inclination on the slope of the roof, and was properly arranged in the stone gutters. The sculptor adopted the custom of working in his own studio, then he fastened his work on the edifice like a tablet on a wall, no longer understanding that for a work of art to be good, it must first of all be made for its destined place. It must be said in praise of the architects of the Renaissance, that they knew how to elevate their profession, debased in the 15 th century by the predominance of the trades, and they could restore its true place to intelligence; but in reducing manual labor to the second rank, they took away its originality, that native vigor which it had always retained until then in our country.

During the 13 th and 14 th centuries, lay architects are c constantly called afar to direct the construction of churches,

per quarter." (A day's work of a woman was paid 1/12 sou). H Here then an administrative council is probably charged with the management of the funds, then a foreign architect is called, not to supervise the execution daily and oversee the workmen, but only to draw up the projects, to give the details, and to see from time to time that men conform to these; for his work as an artist he is promised, not proportional commisions, but a salary per quarter equivalent to a sum of fifteen hundred francs ($300) in our days. It is probable that then the mode of a fixed salary was in use, when an architect was employed.

Beside all our great religious edifices, there always existed a house named the "work", in which lodged the architect and the master workmen, who from father to son were charged with continuing the works. The "work" of Notre Dame at Strasburg has retained that tradition until our days, and one can still see in one of the halls of the masters a part of the d design on vellum, that served for the execution of the portal of the cathedral the tower and spire, the north porch, the p pulpit, the organ front, etc. These designs date from the last years of the 13 th century, and some are of unexecuted projects, while others are evidently details prepared for tracing full size diagrams. Among them are noted plans of the different stories of the tower and the spire superposed. These drawings date from the 14 th century, and must be said to be executed with a knowledge of drawing and a precision in the agreement of projections, that give a high idea of the science of the architect, who traced them. (Arts.Epure, Trait).

During the 15 th century this elevated position occupied by the architects of the 13 th and 14 th centuries was gradually lowered; so that the structures lost that grand character of unity, that they had retained during the fine epochs. One perceives that each trade works by itself and outside the general direction. This fact is striking in the numerous documents remaining to us from the end of the 15 th century; bishops, chapters and nobles, when they desired to build called master masons, carpenters, sculptors, carvers of images, locksmiths, plumbers, etc., and each one made his estimate and his contract for himself; there is no question of the architect, for each trade executes its own project. So the monuments of that

citizens by the man called to direct vast works, either by t the clergy, by the lay nobles, or by the citizens themselves.

It is very difficult to know today what were exactly the f functions of the master of works in the 13 th century. Was he only charged with giving the designs of buildings and with d directing the workmen, or to oversee the use of the funds, as in our time? The documents that we possess and that can cast some light on this point do not precede the 14 th century, a and at that epoch the architect is only called as an artist, who is remunerated for his personal labor. The one for whom he built, purchased in advance and provided the necessary materials, hired the workmen, and the entire work was done according to the method known today by the name of accounting. (Regie). The valuation of the work, the expenditure of funds, do not appear to have concerned the architect. The mode of a-award only later clearly appears, at the end of the 14 th century, but then the architect loses in his importance; it seems that each treated directly for himself for the execution of each kind of work;, and these awards were made to the master of the trade, who offered the greatest rebate in bids, or actual forfeits.

Here is a curious document, [1] that indicates in a precise manner what was the function of the architect at the beginning of the 14 th century. It concerns the erection of the cathedral of Gerona, but the customs of Catalonia at that epoch did not differ from ours, and further it is a question of a French architect.

Note 1. p. 112. Extract from the register "Curia del vicariate de Gerona", years 1320, 1322, p. 48.

"The chapter of the cathedral of Gerona decides in 1312 to replace the old Romanesque church by a new one, larger and m more worthy. The work did not commence at once, and as administrators of the work (oberos) were named Raymond of Viloric and Arnauld of Montredon. In 1316 the work was proceeding, a and there appears in February 1320 on the register of the chapter an architect designated by the name of master Henry of Narbonne. Master Henry dies and his place is occupied by another architect from the same country, named Jacques of Favariis; he agrees to come from Narbonne six times a year, and t the chapter promises him a salary of two hundred fifty sous

following inscription. (Text, Vol. 1. p. 111).

Erwin died in 1318 and his son continued his work up to the great platforms of the towers.

This respect for the work of a skilful and intelligent man perhaps is no longer in our customs; but let us not be vain o of it, for it does not seem to us that oblivion and ingratitude are signs of the civilization of a peaple.

These great architects of the 12 th and 13 th centuries, f for the most part born in the royal domain and more particularly from Ile-de-France, are not all known to us. The names of those who built the cathedrals of Chartres, Rheims, Noyon and Laon, the admirable facade of the cathedral of Paris are not preserved to us, but precious investigations of some archaeologists have revealed to us each day very interesting data on these artists, on their studies and their method of procedure. We shall soon see apear a collection of sketches made by one of them, Villard of Honecourt, with remarks and notes on the monuments of his time. Villard of Honecourt, who directed the construction of thq choir of the cathedral of Cambrai, now d demolished, and who was called into Hungary to undertake important works, was the contemporary and friend of Pierre of C Corbie, a celebrated architect of the 13 th century, constructor of several churches in Picardy, and could well be the designer of the apsidal chapels of the cathedral of Rheims. Th-est two artists together composed a church on a very original plan, described by Villard. [1]

Note 1. p. 111. M. Lassus, our colleague and friend, will soon bring to light the manuscript of Villard of Honnecourt; by what we know of it, it is certain that this work will give a complete idea od the theoretical knowledge of architecture in the 13 th century.

Principally in the cities of the North, that were erected into communes in the 12 th century, does one see architecture more rapidly disengage itself from Romanesque traditions. The intellectual movement in these new municipalities retains nothing of the aristocratic character of the Roman municipality; so one should not be surprised by the progressive course of the arts and industries in a very short space of time, in the midst of those cities enfranchised with more or less success, and the importance that must be taken among their fellow cit-

note the legend, because it gives the measure of the esteem that king S. Louis had for the artist. Pierre of Montereau was buried with his wife in the middle of the choir of the beautiful chapel S. Germain in Paris; that he had erected with parcular care, and which justly passed as a masterpiece, if we judge of the whole by the fragments deposited in the dependances of church S. Denis. This tomb was only an engraved slab, it was broken and cast among the rubbish, when the chapel containing it was demolished.

Libergier constructed at Rheims a church S. Nicaire, an admirable monument erected within the space of thirty years by that architect; a beautiful and fine engraving of the 17 th century preserves for us only the appearance of the facade of this church, the pearl of Rheims; it was sold and demolished as national property. But the citizens of Rheims, more scrupulous than the Parisians, while destroying the work of their fellow citizen, transported his tomb into the cathedral of Rheims, where anyone may see it today; it is an engraved slab. Libergier holds in his left hand a graduated rod, in his right being a model of a church with two spires like S. Nicaire; at his feet are engraved a compass and a square; two angels placed at both sides of his head hold censers. The following iuscription extends around the slab.

(For inscription in old French, see Vol. 1, p. 110).

Note 1. p. 110. See the note of M. Didron on this architect and the engraving of his tomb in Annales archaeologiques, Vol. 1, f. 82, 117.

Libergier wears lay costume; we shall give what we possess of his work under Art. Eglise.

Jean of Chelles erected in 1257, under the episcopate of R Regnault of Corbeil, the two transept gables and the first c chapels of the choir of Notre Dame of Paris. The great inscription carved in relief on the dado of the south portal, by t the place it occupies and the care with which it is executed, emphasiwes the importance attached to a capable man, and the memory that men tried to retain of his work. Here is the inscription. (Text, Vol. 1. p. 111).

In 1277 the celebrated architect Erwin of Steinbach commenced the construction of the cathedral of Strasburg, and over the great portal could still be read two centuries since the

guaranteed by jurors; the laws of labor, of relations of chiefs with subordinates are definite. One makes the design, estimate and specifications, another approves the contracts, a and yet another imposes the responsibility. Outside the cloister emulation is added to the study, traditions are transformed and advance with prodigious rapidity, art because more p personal; it is divided into schools, the artist finally appears in the 13 th century, causes his ideas and his own taste to prevail. It is unnecessary to believe that the high clergy opposed this movement, which would be to comprehend badly the spirit, that then directed the most enlightened body of Christendom. All leads one to suppose that it encouraged this, and it is certain that it knew how to profit by it, and that it directed this into new paths. After the beginning of the 13 th century we see a bishop, Ewrard de Fouilloy, charge a lay architect, Robert de Luzarches, with the construction of the great cathedral, that he desired to erect under the invocation of Notre Dame. After Robert of Luzarches, the work is continued by Thomas of Cormont and by his son Regnault, as the following inscription states, that was found inlaid in copper letters in the labyrinth placed in the middle of the paving of the nave, and removed recently without one voice being raised against the barbarous act.

(For old French inscriptions, see text, Vol. 1. p. 109).

Note 1. p. 109. Maison de Dedole, House of Dedalus, Labyrinth.

Note 2. p. 109. This is an error. In 1220, Philip August still reigned; but it should not be forgotten that this inscription was made in 1288.

Pierre of Montereau, or of Montreuil, was charged by king S. Louis with constructing in 1240 the S. Chapelle of the Palace at Paris, and by the clergy of S. Germain des Pres with the building of the charming chapel of the Virgin, that covers a part of the present Rue de l'Abbaye. Pierre of Montereau w was a layman; it is pretended that S. Louis took him into Egypt with himself, but the fact is doubtful, and if Pierre of Montereau made the voyage over the sea, he was little inspired by the Arab edifices, that he ever visited, for the S. Chapelle resembles the old monuments of Cairo as little as t the temples of Paestum. However that may be, it is well to n

for the schools, painters, learned men, physicians, ambassadors, bishops, sovereigns and popes; for if the Cluny of the 11 th century were razed, one would scarcely find more than darkness, gross ignorance, monstrous abuses. While S. Hugues and his successors struggled against the spirit of barbarism, and also entirely maintained the independence of the spiritual power with a perseverance of which few examples are offered by the history of civilization, there occurred among the people a revolution, whose consequences had a vast scope. A great number of cities, the most important of the north and east of France, conspired and established communes. Thus the remains of the Carlovingian feudalism were undermined on two sides, by the spiritual powers on one side and by the popular revolts on the other. The secular spirit for the first time appeared on the scene with ideas of organization; it wished itself to govern, it began by speaking of rights and liberties; all that is very rude and very uncertain; it soon threw itself into the arms of the clergy to struggle against the nobility, and sometimes aligned itself with the sovereign to crush his vassals. But in the midst of these struggles and efforts, the city learned to know itself, to measure its forces, it had no sooner destroyed, than it hastened to found, without knowing too well what it did or desired; but it founded, it obtained charters and privileges, it became accustomed to organize by guilds, it finally felt that to be strong, it must keep united. Selling itself to all powers, or purchasing them in turn, if weighed upon all, weakened them, and took its place in their midst. Then the arts, sciences and industries ceased to be exclusively shut up in the limits of the cloisters. (Art. Architecture). The great conspiracy of the city is subdivided into conspiracies of citizens by trades. Each of these guilds obtained and purchased privileges; guards its city, is armed, h has its own laws, jurisdiction, finauces prices, its method of instruction by apprenticeship; so well that in the 13 th century the royal power recognized the existence of all these bodies by the laws of Etienne Boileau.

Having once left the monasteries, the art of architecture became a profession, like all other arts. The master of works is a layman, belongs to a body, and he directs workmen, all of whom belong to guilds; salaries are regulated and guarant-

their heads at the windows, the dove springs into the air, s set free by the patriarch.

ARCHE DE PONT. (See Art. PONT). Bridge Architecture.

ARCHITECTE. Architect.

It does not appear that this name was given before the 16 th century to the artists charged with directing the construction of buildings. Architecture held its place among the liberal arts (Art. Arts Liberaux), and was personified by a man or woman holding a square or compass; but the artist, the artizan was termed master of the work, a designation however v very positively different from that of architect, for by work was understood all that contributed the realty and equipment of a building, from the foundation to the hangings, candlesticks, and the little portable articles. There exist no certain facts relating to the character of architect before the 13 th century. The great religious establishments, which included in themselves toward the end of the 12 th century all that e existed of literary, learned end studious men in the West, v very probably furnished the architects, who directed not only monastic constructions, but also secular and perhaps military constructions. The school of Charlemagne arose under the shelter of the churches; there necessarily took refuge all the i intellects devoted to the study of the sciences and the arts. Geometry, drawing, sculpture and painting could be taught only in the sole establishments, that still retained a little quiet and tranquillity in the midst of that frightful chaos of the Carlovingian epoch. Toward the end of the 10 th century, at the moment when it seemed that society was to be extinguished in barbarism, an abbey was founded at Cluny, and from the midst of that religious order for more than a century, th- there came nearly all the men who endeavored with energy and incomparable patience to arrest the progress of barbarism, to put some order in the chaos, to found establishments in a great part of western Europe, from Spain to Poland. It is not doubtful that this centre of civilization, that shone so brightly during the 11 th and 12 th centuries, had an immense i influence on the arts as well as letters and politics. It is not doubtful, that Cluny supplied to western Europe architects, just as it furnished reforming ecclesiastics, professors

they are enclosed in the 15 th century, and form niches recessed between little columns imitated from the antique orders in the 16 th. (Art. Tombeau). One can judce by this very limited survey, of the importance of arcades in mediaeval architecture, and of the infinite number of their varieties; we h have been able to indicate only the principal types, which e evidence by their ingenious arrangement the taste or originality that controlled their execution.

ARCHE (D'ALLIANCE).Arch of Covenant.

It is frequently represented in the stained glass windows reproducing the scenes of the Old Testament. To it is generally given the form of a shrine. Before the mullion of the left portal of the facade of Notre Dame of Paris was placed before 1793 a colossal statue of the holy Virgin holding the infant Jesus with her feet on the serpent with a woman's head, coiled around the tree of knowledge; above this being the statue of the holy Virgin, today replaced by a figure from the 15 th c century, two angels supporting a canopy crowned by the arch of the covenant (1), the prophets being seated at both sides on the lintel; in the tympanum are to be seen two large reliefs representing the death of the holy Virgin and her coronation. The arch of the covenant then occupies there a symbolical place, it being like a bond between the Old and New Testaments. Sometimes the arch of the covenant affects the form of a wardrobe with two doors supported or guarded by lions; of the table of an altar with reliquary. Sculptures or paintings of the middle ages do not appear to have given a special form to the arch of the covenant of the ancient law; they limit themselves in their reliefs or paintings to representing the objects continually before their eyes, for example, furniture, that it was customary ti place baside altars, and in which were enclosed reliquaries, charters, and all precious objects or deeds that formed the treasure of a church. (Arts. Chasse, Armoire).

ARCHE DE NOE. Arch of Noah.

It is represented in reliefs or stained glass windows under the form of a vessel surmounted by a house with roof and windows. Frequently the persons composing the family of Noah show

have served the purpose of stoning by children for a very long time. These reliefs are peers to what antique sculpture has produced of the most beautiful.

We see the ornamental arcades gradually become thinner toward the end of the 13 th century; they lose their special character to confuse themselves with the dado arcades, of which we have given examples. The mouldings are flattened on the gr ground, the little columns are subdivided into groups and belong to the courses of the structure, the spaces become important and suppress the moulded portions. Yet some of these arcades still retain a certain character of vigor; those decorating the splays of two portals of the cathedral of Bourges recall slightly the beautiful arcade of Notre Dame of Paris, that we have given, but are poorer. Sometimes the spaces of the ground, as in the arcades of the central portal of the church of Semur, are filled by seeds, rosettes, lozenges, of slight projection, which produce a beautiful effect and is p perfectly adapted for a dado. We shall also cite the charming arcades of the right portal of the facade of the old cathedral of Auxerre (end of 13 th century), and in which may be seen represented in figures in the round the story of David and B Bathsheba; those of the right portal of the facade of the cathedral of Seez (14 th century), decorated by little gables above the arches, and by figures in the intercolumniations. These decorations disappeared in the 15 th century, and the dados of the portals are occupied only by these penetrations of bases, as difficult to understand as they are monotonous in appearance. (Art. Penetration).

The small arcades play a great part in tombs, the surfaces of altars, reredoses (Arts. Tombeau, Autel, Retable); generally the bases of tombs bearing the reclining statues of the dead are surrounded by arcades in which are represented the mourners, ecclesiastics, or even apostles. But at the beginning of the 13 th century the arcades are most frequently void and m made of stone or white marble detached from a ground of black marble; such were the arcades of the tombs restored at S. Denis by king S. Louis, and fragments of which remain (23). Later these arcades became richer and are crowned by open gables delicately carved in stone, marble or alabaster; they enclose statuettes, sometimes also shields with arms of the deceased;

that although a little later present an analogous arrangement; these of the south portal of the cathedral of Amienswith interlaced arches (20) placed from 1220 to 1225; those so delicateln sculptured and in such a pure taste, that cover the surfaces of the lower part of the central portion of the cathedral of Paris, and between which are represented the virtues and vices (21). About 1220, those arranged in a similar place on the portal S. Anne on the same facade, and between which are sunk fleurs-de-lis imitating a tapestry; finally those of the portal of the Virgin (22), all of the cathedral of Paris, treated with a care and a grandeur in style rarely common. T This last arcade can be given as one of the most complete models of this kind of decoration, and we know of nothing, which can be compared to it. It is enriched by sculptures of the g greatest beauty, and that have the merit of being perfectly arranged por the place they occupy. The figures or animals in the round that fill the spaces between the arches form supports under the great figures with backs against columns, formerly standing on this base, and recall the martyrdom of the saints or personify them. The strong projection of these figures projecting from the little archivolts, was in proportion to the greatness and high relief of the statues, while all t the sculptures placed under the arches and in the intercolumniations is no more than a sort of tapestry, whose small relief does not destroy the great unity of this beautiful dado. One can see, although the engraving gives but a weak idea of this decoration, how the projection of the reliefs loses itself in the background as they approach the ground. The ornaments between the columns are no more than incised carvings, not as dry as a simple line, but presenting wide and deep portions sunk in shell form. The construction of this dado is in perfect harmony with the ornamentation. The ground belongs to the construction. The little twin monolithic columns are rendered very strong by the kind of ornamental partition connecting t them, and bear arches cut in a single block of stone with their tympanums and their jambs. Each compartment of the ornamentation is carved in the height of the course. Unfortunately the hands of the image-breakers of 1792 passed over these, a and most of the figures placed in the jambs have been mutilated. As for the little reliefs beneath the tympanums, they h

There this arcade is better understood and lacks a gutter; b but the open arcade of the nave, also rebuilt in the 15 th century by following the forms adopted at the end of the 13 th century, is no more than an imitation of this mode in external appearance only, since it responds to no need. The central tower of churches erected over the crossings are frequently decorated internally or externally by blind arcades during the Romanesque or transition epochs, especially in Normandy, Auvergne, Saintonge and Angoumois, where this mode of decorating plain walls in the upper parts of edifices appears to have been particularly adopted. The shafts of the central towers of the cathedral of Coutances in the interior, Rouen both interior anf exterior, Bayeux,on the exterior, church S. Etienne of Caen in the interior, Notre Dame du Port and Issoire on the exterior, most of the churches of Charente, etc., have b blind arcades.(Arts. Tour, Clocher). We likewise see arcades employed for decoration in the upper stories of bell towers placed on the facades of Romanesque churches and those of the beginning of the 13 th century, above the portals and under the rose windows. The three last stories of the north tower of the cathedral of Sens, called the Lead tower, are surrounded by blind arcades forming an open gallery only in the middle of the second story. We give here (18) a drawing of the upper trefoil arcade of this tower. It will be noted, that the little coupled columns of this arcade are supported by figures standing on lions; this sort of cariatids is found in some e edifices of Champagne and a part of Burgundy.(Art. Support).

ARCATURES ORNEMENT. Ornamental Arcades.

It remains to speak of arcades so frequently arranged in t the lower part of splays of portals of churches, and that are really then a simple decoration. The arcades previously mentioned are constructed, almost always forming a part of the c construction, their arches are composed of voussoirs, and as we have before emphasized, form as many discharging arches r resting on monolithic columns; while the base arcades are mostly cut in stone blocks. Such are the arcades placed below the now destroyed statues of the portals of the cathedral of Seez (19), which date from the first years of the 13 th century; those of the north portal of the cathedral of Troyes, t

that edifice, as well as in a great number of little churches of Maconnais and upper Burgundy. On the exterior of the apses, Romanesque arcades were lavished on the religious edifices of Languedoc, Provence and particularly of Saintonge, Poitou and Berry. There may still be seen a beautiful band of an arcade alternately blind and pierced by windows on the exterior of the triforium of the round church of Neuvy-s-Sepulchre, 11 th century. (Art. Saint-Sepulchre). This system of arcades enclosing windows was adopted in Auvergne on the exteriors of apses, on the upper parts of naves and of transept gables; here is an example taken from the north arm od the cross of church S. Etienne of Nevers, erected in the 11 th century on the plan of the churches of Auvergne (16). This arcade presents an arrangement belonging to the churches of that province, which is that the triangle replaces the round arch in certain cases. The church of Notre Dame du Port at Clermont gives us on the north and south transepts an arcade nearly similar to this; but at S. Etienne of Nevers these arcades decorate the interior and exterior of the north transept, while at Notre Dame du Port they only exist in the interior. There is no need of stating that the upper arcades of nave or apse could not find place, when the pointed vault was adopted, since then the archivolts of windows rise up to the upper arcade; thus one no longer meets them in the monuments of the 13 th, 14 th and 15 th centuries, unless in the cathedral of Rheims, where it is seen to appear as a last reflection of the upper Romanesque arcades. Here these arcades are above the cornices, and m may be regarded as balustrades, if their unusual dimensions prevent them from being confounded with that member of pointed architecture. They are rather clearstories, whose utility can hardly be explained. The chapels of the choir of the cathedral of Rheims are crowned by rows of detached columns supporting arches and a band. This decoration dates from the 13 th century, and takes a great importance by its dimensions; it has the defect of being out of scale with the other parts of the edifice, and dwarfs the chapels because of its analogy to the form of a balustrade (17). The crowning members of the same cathedral were likewise terminated by a blind arcade, of which remain a great quantity of fragments reset and restored at the end of the 15 th century after the burning of the roofs.

passage at the level of the window sills of these windows. Th This high sill is ornamented by a series of great round arcades surmounted by a cornice, whose projection is supported by delicately sculptured little corbels (13). Analogous arcades are seen in the nave of church S. Radegonde of Poitiers, which dates from the same epoch.

ARCATURES DE COURONNEMENT. Crowning Arcades.

In some Romanesque churches, particularly those erected on banks of the Rhine, men had the idea of lightening the framework above the tunnel vaults, by means of open arcades forming low galleries below the cornices. (Art. Galerie). The tunnel vaults of the nave or half domes of the apses, left a plain wall of disagreeable appearance between their spandrels and the cornice suitably elevated to allow the tie-beams of the carpentry to pass above the extrados, and which was further of great weight (14). Whether there is a section of a wooden tunnel vault or of a half dome, the windows cannot rise above the springing of the vault. For these vaults without allowing penetrations, which was not customary, there remained from A to B at the level of the cornice, a wall required by the location of the carpentry; this wall was pierced at C by an open gallery or one closed by a thin wall, then destined either to ventilate beneath the roofs, or to form a passage relieving the lower construction. This arrangement was inspired by a c calculation of the constructor and became an ornamental motive in some religious monuments of France. In the 12 th century the upper part of the nave walls of the cathedral of Autun, covered by a pointed tunnel vault reinforced by transverse a arches, was decorated by a blind external arcade, that occupies this plain increase in height of masonry, although indeed it is of no utility; it was only placed there to satisfy the eyes, and as a tradition of the open galleries of Romanesque edifices on the banks of the Rhine. This arcade (15) has something particular, that in form is an imitation of the galleries or passages of thw antique gates still existing in that city (gates of S. Andre and of Neron). It must be believed, that this motive was very much in fashion then, for it was r repeated to satiety in the cathedral of Autun and in the churches of Beaune and Saulieu, that are merely imitations of t

desired to see in the arcade below the sill the continuation of the window as a panel below it. They extended the mullions of the windows across the panel below the sill, and the arcade becomes confounded with them. Thenceforth the window seemed to extend down to the lower plinth; the last vestiges of the Romanesque wall thus disappeared, and the pointed system was established in all its rigor (11). This example was taken from the side aisles of the choir of the cathedral of Seez, and dates from the last years of the 13 th century. However the little gables arranged above the arches again give to t these dados a decoration, that isolates them from the windows, that makes a separate member having its own character, while later at the beginning of the 14 th century, as in the choir of church S. Nazaire of Carcassonne, the low arcade being c connected with the mullions of the windows adopts their form, is composed of the same moulded members and repeats their compartments (12). It is actually only the lower part of the window that is blind, and indeed is compelled to recede inside to the plane of the glass, so that it retains only a small t thickness, that is equivalent to a simple partition. It was impossible to go farther. During the 14 th and 15 th centuries , the low arcades retained the same appearance, merely varying in the details of the ornamentation according to the t taste of the moment. They were observed to disappear suddenly about the middle of the 15 th century, and that is explained by the custom adopted then to line the lower parts of chapels with woodwork more or less rich. With the arcades also disappeared the stone plinths, these for a still stronger reason being replaced by wooden bases. Manners more refined, the custom adopted by wealthy and powerful families or by brotherhoods, of founding special chapels to assist divine service, c caused them to prefer wooden paneling and very dry seats to those walls with cold and damp plinths.

We cannot omit among the arcades of the ground story, the great arcades of the side aisles of the cattedral of Poitiess. This edifice (Art. Cathedrale), built about the end of the 12 th century and the beginning of the 13 th, presents particular arrangements, that belong to Poitou. The vaults of the side aisles are as high as those of the nave, and the wall below the windows, thick and high, forms a gallery serving as a pas-

side aisles, at the height of the eye plain parts, that would have been in a complete discord with the general system of p piers and openings adopted by the architects. These arcades serve as a transition between the floor and the tracery of t the windows, however retaining by the vigor of the mouldings, the narrowness of the intercolumniations and the strong projections of the plinth, a certain solidity of appearance necessary to the base of a monument. The side aisles of the cathedral of Rheims, although provided with those broad plinths w with a step before them, never had or have been despoiled of their arcade; so one is shocked by the nakedness of the stone walls beneath the sills of the windows, a nudity that contrasts with the wise richness of the entire interior of the edifice. For us it is not doubtful that the side aisles of the cathedral of Rheims should have been, or were provided with arcades, as were formerly those of the nave of the abbey church of S. Denis, the lower parts of these two naves having t the greatest affinity. We give(9) the low arcade of the nave of the church of S. Denis, all the fragments of which still exist in the storehouse of that edifice, and the traces of which are visible on the places. Let us say in passing, that with some fragments of that arcade the tomb of Heloise and Abelard was composed by M. Lenoir in the Museum of Petits Augustins, now deposited at Pere Lachaise.

It is unnecessary to believe that all arcades have rigorously followed the way that we have just traced in order to attain their development; before arriving at the adoption of the pointed curve, one finds experiments, for it is especially d during transition periods that exceptions are multiplied. We shall give one that dates from the first years of the 13 th century, and which can be counted among the most original; it is found in the side aisles of the church of Monter-en-Der ((10), a charming edifice filled with architectural oddities, and that we shall have occasion to cite frequently . Toward the end of the 13 th century the low arcades, like all other members of pointed architecture become more slender; they present the appearance of a structure, of a dado, that they retained until then, to take the part of facings. The so imperiously logical genius, that inspired the mediaeval architects, soon brought them to abuse in this as in everything. They de-

little.columns of the arcade are coupled, already supporting small pointed arches, although the round arch long continues in these accessory members of architecture, and until toward the first years of the 13 th century; thus the chapels of the choir of the abbey church of Veqelay are decorated beneath the sills of the windows by arcades belonging to the 13 th century by the details of their ornamentation, while their arches are actually round.(4). In Burgundy the round arch continues even in arcades until the middle of the 13 th century . The little church of Notre Dame of Dijon, whose erection is later than that of the abbey of Vezelay, allows to be seen s still on the lower walls of its transept chapels, beautiful round arches on capitals, that have nothing of Romanesque ornamentation. The pointed curve was applied to the arches of arcades only toward 1230, the trefoil arch serving as a transition, as it is seen to be used in the north transept of church S. Jean of Chalons-sur-Marne (5), whose lower part dates from 1220 to 1230; in the still existing bays of the side aisles of the cathedral of Amiens of the same date; later from 1230 to 1240, the pointed arch reigns alone (6), as one can see in the chapels of the choir of the cathedral of Troyes, at first simple and only decorated by mouldings broadly profiled, then a little later toward 1240 by cusps, as in the chapels of the choir of the cathedral of Amiens (7), or the lower S. Chapelle of Paris. But until then, the low arcades, t that belong to a rich monument or to the church of a small c city are nearly similar. But toward 1245 when pointed architecture attained its climax, the arcades in edifices built with luxury take great importance, are enriched by reliefs, ornaments, openings, tending to form a splendid decoration beneath the windows, always allowing to be seen the face of the wall between the columns; these walls themselves receive paintings, applications in relief, or of colored and gilded glass. The upper S. Chapelle offers us the most beautiful example , that can be given of an arcade so treated.(8). Then in religious edifices, the scheme adopted by constructors allows the walls to be seen only beneath the sills of windows of the side aisles; all the construction being limited to the piers and the windows filled with glass, one can conceive that it would have been disagreeable to find beneath the stained glass of the s

century, the construction of the masonry appears to justify the use of the arcade; the walls are built of rubble faced w with small stone cubes like certain Gallo-Roman structures. The arcade by its larger jointing, the vigor of its monolithic pieces, increases the solidity of that wall while decorating it,it accompanies and crowns this plinth, which extends the entire length of the side aisles. Most frequently at that epoch the arcades are supported by small detached columns ornamented by bases and carved capitals; we shall select as an example the arcade of the side aisles of the abbey church of Souvigny (2), always resting on a plinth according to the adopted custom. In these arcades, the base, capital and the voussoirs of the small arches are bonded in the masonry of the wall, and the shafts of the little columns are detached, being composed of a piece of stone set on edge. At Souvigny the arches rest alternately on a rectangular pilaster and on a l little round column. This example dates from the first years of the 12 th century. As the architecture relieved itself from the rather heavy forms of the Romanesque epoch, the low arcades became more refined, the arches are decorated by mouldings, and the columns are more slender. In the south side aisle of Church of S. Madeleine od Chateaudun may still be seen the remains of a beautiful arcade of the 12 th century, which serves as a transition between the Romanesque and pointed styles; (3); the abacuses of the capitals are varied and finely moulded, the arches are ornamented by sawteeth. The low arcades of the monuments of Normandy of about that epoch are curiously wrought, sometimes composed of a series of small round arches that intersect, and either rest on a row of a little columns or on alternating columns and corbels; but it is particularly in England that the Norman style has developed that species of decoration in which some minds more ingenious than enlightened have desired to see the origin of the pointed arch.(Art. Ogive).

The north aisle of the choir of the cathedral of Canterbury presents externally between the windows of the crypt and those of the side aisles an arcade that we give here (3 bis), and that forms a rich band between the buttresses; this example dates from the last years of the 12 th century. In the lower story of tower of S. Romain of the cathedral of Rouen, the l

little columns of the arcade are coupled, already supporting small pointed arches, although the round arch long continues in these accessory members of architecture, and until toward the first years of the 13 th century; thus the chapels of the choir of the abbey church of Veqelay are decorated beneath the sills of the windows by arcades belonging to the 13 th century by the details of their ornamentation, while their arches are actually round.(4). In Burgundy the round arch continues even in arcades until the middle of the 13 th century . The little church of Notre Dame of Dijon, whose erection is later than that of the abbey of Vezelay, allows to be seen s still on the lower walls of its transept chapels, beautiful round arches on capitals, that have nothing of Romanesque ornamentation. The pointed curve was applied to the arches of arcades only toward 1230, the trefoil arch serving as a transition, as it is seen to be used in the north transept of church S. Jean of Chalons-sur-Marne (5), whose lower part dates from 1220 to 1230; in the still existing bays of the side aisles of the cathedral of Amiens of the same date; later from 1230 to 1240, the pointed arch reigns alone (6), as one can see in the chapels of the choir of the cathedral of Troyes, at first simple and only decorated by mouldings broadly profiled, then a little later toward 1240 by cusps, as in the chapels of the choir of the cathedral of Amiens (7), or the lower S. Chapelle of Paris. But until then, the low arcades, t that belong to a rich monument or to the church of a small c city are nearly similar. But toward 1245 when pointed architecture attained its climax, the arcades in edifices built with luxury take great importance, are enriched by reliefs, ornaments, openings, tending to form a splendid decoration beneath the windows, always allowing to be seen the face of the wall between the columns; these walls themselves receive paintings, applications in relief, or of colored and gilded glass. The upper S. Chapelle offers us the most beautiful example , that can be given of an arcade so treated.(8). Then in religious edifices, the scheme adopted by constructors allows the walls to be seen only beneath the sills of windows of the side aisles; all the construction being limited to the piers and the windows filled with glass, one can conceive that it would have been disagreeable to find beneath the stained glass of the s

dimensions, which are rather intended to ornament the plain parts of walls beneath the sils of windows or cornices, than for a need of construction. There are found in certain edifiices of the late empire ranges of blind arcades, that have o no purpose other than to decorate the plain wall. This ornamental motive appears to have been especially adopted and retained by the architects of the Carlovingian epoch, and it continued during the Romanesque and pointed periods in all the provinces of France. Yet is well to observe that the use of arcades is more or less justified in Romanesque edifices; some countries, for example Normandy, have abused the arcade on c certain mounments of the 11 th century, not knowing too well how to decorate the facades of great churches, the architects superposed rows of blind arcades from base to ridge. It is p particularly in Norman edifices built in England, that this abuse is felt; the facade of the cathedral of Peterborough is an example of this. Nothing is more monotonous than this superposition od arcades of equal height and width, whose utility is understood neither as a means of construction nor of d decoration. In France the feeling for proportions, for the r ratio of voids and solids, permeates architecture from the t time that it escaped from barbarism. From the 11 th century these important details of the ornamentation of masonry, such as arcades, are restricted within proper limits and keeping their places, only appear to be facings from a sterile invention in England or Italy, for example on the facade of the cathedral of Pisa. We shall divide arcades:-- 1, arcades on the ground story; 2, crowning arcades; 3, ornamental arcades.

ARCATURES DE REZ DE CHAUSSEE. Arcades of the ground story. This sort of arcade is generally placed in the interior in French architecture, beneath the sills of the low windows, a and forms a series of little blind arches between the floor and the sill. The great halls, side aisles of churches, chapels, nearly always have their lower walls covered by a series of arches of little projection supported by pilasters or small detached columns resting on a continuous base or plinth of s stone. We give as a first example of this kind of decoration an internal bay of the side aisles of the nave of the cathedral of Mans (1). In this example, which is of the 11 th cent-

ears, and to bond them with horizontal courses by means of r rectangular joints at the ends, the true function of the arch no longer was understood. (Arts. Construction, Voute).

ARCADE. Arcade. Arch.

A word that designates the whole of an opening spanned by an archivolt. One says; "the arches of this portico open on a court." The work is general comprising the void and the solid, the archivolt and the jambs. Also one says; "blind arch" to designate an archivolt or discharging arch with joints projecting from a solid wall. The discharging arches of side aisles of Church S. Etienne of Nevers (Art. Arc. Fig. 74) are blind arches. Blind arches are very frequently employed in t the Romanesque edifices of Poitou, Auvergne, Saintonge and A Angoumois; but when these have small dimensions, they are termed arcades (Art. Arcature). Constructors of the Romanesque epoch giving the walls of their edifices a great thickness a according to Roman tradition, and also to resist the uniform pressure of tunnel vaults, both to economize materials as well to ornament those massive walls and render them less heavy, sought to lighten them by means of a series of arches (Art. A Arc de Decharge), that however permitted them to retain the thickness of the walls necessary to resist the thrusts of the tunnel vaults above the extradoses of these arches. By the u use of cross vaults in edifices, it was no longer useful to build thick continuous walls; men were satisfied to arrange projecting buttresses at the thrusts (Art. Construction), and the intervals between these buttresses being then only thin masonry enclosures, blind arches or discharging arches no longer had any reason for existence. But that tradition remained, and the architects of the pointed period continued for p purely decorative ends, to arrange blind arches (arcades) beneath the sills of windows of the side aisles in the interiors of their edifices, at first strongly projecting, then gradually reduced until the end of the 13 and during the 14 th centuries, so as to be no more than a facing more or less rich, a sort of stone filigree designed to cover the naked wall.

ARCATURE. Arcade.

A word by which is designated a series of arches of small

discharging arches were much employed to support massive constructions, apparently restingoon perforated construction; to relieve the tracery of the great rose windows of the weight of the front gables.

It is unnecessary to say, that arches play a great part in the construction of mediaeval edifices, architects in the 13 th century having attained a perfect knowledge of their resistance and their effects on piers and walls, they took special care in the choice of materials to compose them, en their cutting and jointing. Roman architecture merely opened the way f for the application of arches to the art of building; mediaeval architecture proceeded as far as it was possible, to the point even of abusing this principle at the end of the 15 th century, perhaps by a too absolute use and refinements carried to excess.

The essential quality of the arch is elasticity. The greater its extent, the larger the space it must span, the more n necessity for it to be flexible. Mediaeval constructors followed this principle perfectly by multiplying the joints in t their arches, composing them of equal voussoirs, always carefully with extradoses. Only in the 16 th century, when the a art of building, properly called, subjected the use of materials to forms unsuitable to both their qualities and fimensions, that the arch was no longer employed according to its t true function. The logical principle that caused its adoption, ceased to direct constructors. By imitating, or believing that they imitated, the forms of Roman antiquity, Renaissance architects wandered farther from the principle of the antique construction than the architects of the 12 th and 13 th centuries; or rather they did not take it into account. If in their massive and immovable structures, the Romans comprehended the necessity of leaving to the arches a certain elasticity by giving them extradoses, by forming rows of concentric voussoirs, when then needed to give them great strength, for a stronger reason in mediaeval structures, where all is equilibrated, a and movement results, one should not lose sight of the principle, that should direct architects in the construction of a arches. From the day when it ceased to give extradoses to arches, when it was desired to compose them of voussoirs of unequal dimensions, also of unequal weights, to joint them with

sought continually to diminish the points of support in the ground story, so as to leave the most space possible for the crowd, and to not obstruct the view, this principle led them to corbel out a part of the upper construction; if across the nave they placed flying buttresses ove the side aisles, to t transfer the thrust of the great vaults to the exterior, it was necessary in the direction of the length to avoid loading the walls with galleries corbelled out on the vaults of these side aisles, too light to carry the load of a wall, however thin it might be. Hence to avoid the injurious effect of this weight on the vaults, discharging arches were arranged in the thickness of the lower walls of the galleries in the second story. These arches transfer the load of these walls to the imposts of the transverse arches of the side aisles. (Arts. construction, Triforium, Galerie). Pointed discharging arches are found in the high galleries of Notre Dame of Paris, in the triforiums of the naves of the Cathedrals of Amiens (79), Rheims and Nevers. But at Amiens the upper windows being set on the internal opening of the triforium, these discharging arces only bear the weight of a thin wall, that rises only to t the sill of the window above. In the edifices of Burgundy and a part of Champagne, the windows instead of being set on the internal arcade are recessed in the external wall of the triforium. In this case, the discharging arch is so much the more necessary, because the external wall supports the window tracery with the corbelled crowning cornice; it is sometimes set directly above the extrados of the archivolt, so as to avoid the load of the filling, which as at Rheims, Paris and Amiens is attached to the intrados of the pointed arch, or also the discharging arch is only a segmental arch inserted in the thickness od the wall, a little above the floor of the gallery, as may be seen in church S. Pere-sous-Vézelay (80).

Discharging arches are found at the base of the central towers of churches restiug on the four transverse arches of the crossiug, as at the cathedral of Laon. Beneath the belfries of towers, as at Notre Dame of Paris, they also exist above vaults to transfer the weight of the wall and carpentry to t the piers, and to relieve the tracery of windous, taking the places of side arches as at S. Chapelle of Paris, at Amiens and the cathedral of Troyes (81). In the 15 th century disch-

solid wall, so as to transfer the loads to the points of fo dation and substructure more substantial than the rest of t structure. This tradition was still observed during the Rom nesque period. But at that epoch construction in concrete w no longer in use, and very rarely are found arches designed to distribute the weight in a solid wall. Besides in Romane que edifices the construction nearly always becomes a decor tive motive, and when in building men needed discharging ar es it was sought to accent them, either by a projection, an even somemtimes by a decorated band or moulding at the extr dos. Such are the discharging arches to be seen along the w lls of the side aisles of church S. Etienne of Nevers (end 11 th century) (74). Here the arches are particularly inten ed to load the piers of the side aisles, that receive the t rusts of the vaults; the walls not having buttresses, this increased loading gives great stability to the principal po nts of support. It is a system permitting the building of t walls between the piers intended to receive the weight of t structure, and consequently presents an economy of material it is seen applied in many churches of Poitou, Anjou, Auver ne and Saintonge during the Romanesque period. Unnecessary add that these discharging arches are always cut with an ex rados; since their essential function is to transfer the lo above to their imposts; they should tend to cause the mason on them to slip.

The gable of the south transept of church Notre Dame du-P at Clermont-ferrand is thus borne on two external discharg arches resting on a column (75). Frequently in the secular architecture of the 11 th and 12 th centuries are found ar doorways with lintels relieved by discharging arches, thei imposts resting on skewbacks cut in both ends of the linte (76), also sometimes above the lintel is seen a keystone i the next course, thus forming a jointed platband transferr the weight of the wall to the two jambs (77). A space is t left between the bottom of the keystone and the lintel to oid the load of this keystone in case of movement in the s ucture. These arches are round (78).(castle of Polignac, 1 th century), rarely pointed, most frequently segmental to cupy less height below the floors.(Art. Fenetre). During t pointed period, constructors had to span great openings an

the choir of church of Mont-s-Michel, they replaced the side projections A by arches turned from one flying buttress to t the other like a series of struts designed to stiffen all the buttresses of these flying buttresses.

From all the preceding may one conclude, that the architects of the middle ages, after having solved the problem of the co- construction of vaults on slender and isolated piers by means of the flying buttresses, were struck by the difficulties in execution presented; soon after the application of the principle. All their efforts aimed to establish equilibrium between the thrust of the vaults and the resistance of the flying buttress, to base that system on fixed rules, which was impossible, since the conditions of equilibrium were codified according to the nature, weight, resistance and dimensions of the structure. Men of higher genius, as always happens, knew how to conquer these difficulties, rather by instinct than by calculation, by the observation of particular facts, than by the application of absolute rules. Ordinary constructors have followed certain examples under their eyes, but without considering the exceptional cases they had to treat; then they were often mistaken. Should it be said for this that the flying b buttress is a means whose use should be prohibited, because it requires great sagacity on the part of the constructur? We do not believe this. For because the application of a system presents difficulties and a certain shrewdness of observation is no reason for condemning it, but is one for studying it w with the greatest care.

ARC DE DECHARGE. Discharging Arch.

Thes arch is inserted in structures over lintels of doors, above openings in general and weak portions of lower construction to transfer the weight of construction over them to supports with assured stability. The archivolts of portals and doors are actual discharging arches (Art. Archivoltes, variety of the arch); but the name of discharging arch is rarely give except to arches with surfaces flush with the wall, only distinguished from horizontal courses by their jointing, and sometimes by a slight projection. In Roman structures erected with materials of small size and with concrete, one often finds discharging arches in bricks or rubble inserted in the s

the 13 th, the system of flying buttresses was applied to great vaults resting on isolated piers, men at first only thought of abutting the thrusts of the vaults of naves and choirs. T The vaults of the transepts returning at a right angle were abutted only by buttresses projecting but little. men thusted to the short length of the transverse members composed of two or three bays of vaults, assuming that the abutment by the b buttresses of the gables and those of the walls of the nave suffice to resist the thrust of the transverse arches between these abutments. For example at the cathedral of Paris (71), there have always existed flying buttresses from A to B to r resist the thrusts of the vaults of the nave and the choir; b but the spans of the vaults of the cross pieces is only maintained by the two thin buttresses D and C, and there have never existed flying buttresses from D to A and C to A. Indeed men did not think op constructing flying buttresses, that would have taken sidewise the buttress A E, assuming that these buttresses extended to the prolongation of the transverse arch C D, which did not ommur at the cathedral of Paris. This unsolved difficulty sometimes caused the ruin of the cross pieces soon after their construction. Thus from the middle of the 13 th century were arranged buttresses at the angles formed by the transepts so as to abut the vaults in both directions. (72). At the cathedral of Amiens, for example, these buttresses at the junction of the transept and choir present inplan a cross form, and there exist flying buttresses from D to C as well as frog A to B. When the flying buttresses have double spans, the first span extends from D to F and also from G to F.

Accordingly it often occurred, that the flying buttresses of the nave or choir thrusting sidewise against very wide but thin buttresses, really only walls (73), as at the choir of Notre Dame of Paris, church S. Denis, cathedral of Mans, tended to overthrow these walls; toward the middle of the 13 th century were also built side projections A at the sides of t the buttresses to prevent this overthrow. (Art. Contre-Fort).

Men did not stop there; these masses of lofty structures to maintain the flying buttress could not satisfy the constructors of the 15 th century, who desired their edifices to appear lighter than they really were. In some churches, notably in

14 th ce tury. Light vaults rest on slender and long columns and are abutted by arches, that rest on buttresses entirely independent of the monument; no walls; columns, vaults, isolated buttresses, and the flying buttresses placed placed according to the resultant of the thrusts. There is in all that quite important construction only a very limited volume of m materials, set with as much art as economy (70). A is the plan of that porch, B is the view of one of its angle flying buttresses. As in all good construction of that period, the flying buttress only supports the column just at the point of the thrust, staying the impost receiving the transverse and diagonal arches and archivolts. Above the flying buttresses the buttresses are made more stable by the pinnacles, and the columns themselves are loaded and stiffened by piers above them. It is easy to comprehend in examining the plan A how the two vaults of the porch, that rest at one side on the transept wall and at the other on the three columns C, D, E, can maintain themselves on such slender supports only by means cf the abutment of the three flying buttresses C F, D G, E H, transferring the resultants of their thrusts to the three buttresses I K, L. The area M C D E N alone is covered, and as it were forms a great canopy supported on slender columns. This elegant structure has experienced neither movement nor displacement, in spite of its extreme lightness, although it may have remained long under the worst conditions.

One might observe from all the examples we have given, that the flying buttress began to be chamfered or demoratedby mouldings only after the second half of the 13 th century. Generally the mouldings of the flying buttress are always simpler than those of the transverse arches; it is evident that it w was feared to weaken flying buttresses exposed to weather by the hollows of mouldings, and that in having them moulded was obeyed the desire to not cause these arches to contrast in a disagreeable manner with the richness od the archivolts of t the windows and the profusion of mouldings covering all architectural members from the end of the 13 th century. Yet the mouldings cut on the intrados of the flying buttress are always simpler and retain a greater apparent strength than those on the archivolts and the arches of the vaults.

When at the end of the 12 th century and the beginning of

16 th, architects claimed so much to improve the construction of the flying buttress, that they forgot the primary conditions of its stability and resistance. Instead of composing them of a single circular arc frankly abutting against the thrusts, either by itself or by its combination with a rigid construction serving as a strut, they gave it compound curves, resting them on the piers of the nave at the same time that they prevented the spreading of the vaults. They no longer thus considered the essential condition of the slipping of the crown of the arch, whose utility has been explained; they tended to push the piers inside, below and in the direction opposed to the thrust of the vaults. We give here (69) one of the flying buttresses of the nave of Church S. Wulfrand of Abbeville, c constructed according to the last principle during the first years of the 16 th century. These arches have produced and s suffered serious injuries because of their vicious arrangement. The external buttresses have settled; ruptures and crushings have appeared at the points A of the arches, the imposts B h having prevented the slipping, that might have occurred without great inconveniences. The arches broken at the points A no longer abut the vaults, that thrust and crush the upper c channels by the leaning of the walls; at the same time these arches are deformed and loaded by these channels, that receive the pressure of the vaults, act powerfully on the imposts B, and then pusing the piers toward the interior at the springing of the vaults, again increase the causes of the spreading. To explain ourselves in a few words, when the flying buttresses are constructed according to this system, the thrust of the vaults acting from C to D loads the arch A vertically, increasing the pressure of the piers of the channel. This vertical load resting on an elastic construction thrusts from A to B. Then the greater the thrust from A to B, the more the thrust of the vaults acts at C by the pushing over of the line D C. Then the imposts placed at the head B of the flying buttresses are contrahy to even the principle of the flying buttress.

The north and south porches of the church S. Urbain of Troyes may give a very correct idea of the function fulfilled by the flying buttress in the edifices of the pointed period. T These porches are like the section of a small church of the

62, 63. Those too rigid struts A B, C D are not parallel, but approach in A C like two struts of wood, so as to better traansfer the thrust acting from B to F to the single flying buttress of the span E. The rigid strut A B serves as a channel for the water from the roof. Hence this construction is more wise than graceful, and art is entirely sacrificed here to general combinations.

This system of perforated rigid flying buttresses was sometimes employed with much more reason, when it was necessary to resist a thrust acting in a narrow opening as in the lower S. Chapelle of Paris. (13 th century). This flying buttress is there composed of a single stone piece and apparently exerting a very slight resistance, but very rigid in reality, to the pressure of a vault. The lower S. Chapelle of the Palace is composed of a nave and two narrow side aisles, so as to diminish the span of the vaults in order to avoid making their springings too low; but the vaults of these side aisles a attaining the height of the crown of the nave vaults (68), it was necessary to oppose the thrust of the great transverse a and diagonal arches at the point A by means of an actual strut. The architect thought of fixing that point A and of transferring its thrust to the external buttress by forming a perforated triangle A B C cut from a single piece of stone.

This system of the flying buttress, or rather of a strut, is often employed in secular structures to resist thrusts. The mantles of the four kitchen fireplaces named after S. Louis in the palace at Paris are supported by struts, each also made of a single perforated piece of stone.(Art. Cheminee).

It no less results that the flying buttress supporting a c channel was perfected from the point of view of the perfect knowledge of thrusts during the 14 th and 15 th centuries, as well as the single or double flying buttress. Constructors b became able to calculate accurately the weight necessary to be given to the perforated channels to prevent the rising of the arch. The groove in the channel becomes a strut by the strength that it gives as well as by the manner in which it is jointed.

As alway happens when an adopted system is pushed to its extreme limits, one finally loses the trace of the principle that developed it; at the end of the 15 th century and during

the stone strut D E. The arch A B C, whose flexibility is further neutralized by the horizontal B G and the girdle F, is there only to prevent the strut D E from bending. If the architect who traced this flying buttress had cut a triangle D B G in a single slab of stone, he might have dispensed with the tie A B. Yet to dare to joint a flying buttress in this mannen, it was necessary to be very certain of the point of the thrust of the vault and its direction, for if this system of abutting had been placed slightly above or below the thrust, if the line D E were not inclined at the proper angle, there would have been a rupture at the point B. For this rapture n not to occur, it is necessary to assume that the resultant od the different pressures of the vault act absolutely in the l line D E. It is then not too far advanced to say, that the system of the flying buttress in the 14 th century had reached its most complete development. But one might be right according to the absolute rules of geometry, and still lack sense. The man who directed the construction of the church of S. Urbain of Troyes was certainly mucr wiser, a better mathematician, than those who built the naves of Chartres, Rheims or A Amiens, yet the latter have attained the purpose, and the first has excelled in wishing to apply his materials to geometrical combinations, that are in complete discord with their nature aud properties; desiring to give stone a function belonging to wood, finally torturing the art form, to give himself the private satisfaction of subjecting them to the solution of a probceg in geometry. These are examples as good to study as bad to follow.

This same principle is adopted in great edifices. In the p part of the nave of the cathedral of Troyes, that dates from the 15 th century, may be seen a double span particularly well arrauged to resist the thrusts of the great vaults. It is composed of two rigid struts of stone connected by an open arcade (67); the lower strut is tangent to the extrados of the arch so as to transfer the thrust to the springing of that arch, yet leaving it free by the arrangement of the jointing. The piers of the open arcade are perpendicular to the direction of the two struts, and thus stay them much better than if they were vertical, as in the flying buttresses of the choirs of the cathedral of Amiens and the church of Eu, given in Figs.

submissive to classical rules, they are even by this interesting for study by us today. The flying buttresses of these three edifices (the lhoirs alone have been built at Limoges and Narbonne) are combined with great art and a thorough knowledge of the thrusts of vaults; thus in these three cathedrals, also very light as a system of construction, the piers have remained perfectly vertical in their entire height, the vaults have not a crack, the flying buttresses have preserved all the primitive purity of their curves.

We give here (64) one of the flying buttresses of the cathedral of Clermont-Ferrand, built of lava of Volvic like this e entire church. One of the flying buttresses of the cathedral of Narbonne (65), which is a very resistant limestone. As for the choir of the cathedral of Limoges, it is built of granite. In all these flying buttresses the piers A rest on the piers at the head of the chapels, and the opening A B lies above t the thin part of the division walls of the chapels, as at Amiens. These structures are executed with perfect precision. Then in the 14 th centurw the flying buttress, from the point of view of science, had attained the last degree of perfection; to wish to go farther was to fall into abuse; but the mediaeval constructors were not men to stop in the path. Evidently these permanent struts were a permanent charge against the g general system adopted in the construction of their great churches; they strove to conceal them, either by covering them with ornaments, or in concealing them with great ingenuity, as at the cathedral of Rheims by the pinnacles of the buttresses, which are as many masterpieces, or by reducing them to their simplest expression by giving them the stiffness a strut should have. The last scheme was frankly adopted in the 14 th century in the construction of the flying buttresses of the church of S. Urbain of Troyes (66). Let this figure be carefully examined, and it will be seen, that the flying buttress is composed of a small number of pieces of stone; it is no longer as in all the prededing arches a series of thin voussoirs, retaining a certain elasticity, but on the contrary is of stones set end to end, thus acquiring the qualities of a wooden strut. It is no longer by the load that the arch retains its rigidity, but by the combination of its jointing. Were the abutting is not by means of the arch A B C but by t

same principle is adopted in the construction of each one.

The use of the flying buttress in great edifices requires a thorough knowledge of the thrusts of vaults, a thrust, as we have said, that varies according to the nature of the materials employed, their weight and their degree of resistance. One should then not be surprised if the numerous attempts made by inexperienced constructors have not always been fully successful, and if some edifices have perished by the lack of experience of their architects.

When the dominating taste toward the middle of the 13 th c century impelled constructors to erect the excessive lightness and the great height beneath the vaults, when they abandoned everywhere the system of primitive flying buttresses of which types have been given (Figs. 50, 52, 54), there must have been experiments and hesitations, indeed during a half century, b before finding what they sought; the flying buttress reduced to its true function. Skilful constructors quickly solved the problem in different ways, as at S. Denis, Beauvais, S. Peter of Chartres, cathedral of Mans, S. Etienne of Auxerre, Notre Dame of Semur, cathedral of Rheims, Coutances, Bayeux, etc., all edifices built from 1220 to 1260; but the unskilful (such are found at all times) committed many errors, even at the m moment when experience acquired by numerous examples permitted the establishment of fixed rules and formulas, that could serve to guide unskilled constructors, not endowed with natural genius. At the end of the 13 th century and during the 14 th, indeed the flying buttress was applied everywhere without hesitation; it was then perceived that the rules relating to the stability of vaults had become classical, and if the same bold genius wandered from them, this was exceptional.

There exist in France three great churches built during the 14 th century, that cause us to see how far these rules on c construction of vaults and of flying buttresses became fixed; these are the cathedral of Clermont-Ferrand, Limoges and Narbonne. These three edifices are the work of a single man, or at least of a particular school, and although all three are built beyond the Loire, they belong to the architecture of t the North. In plan and construction these three churches present a complete analogy; they differ only in their decoration; their stability is perfect; a little cold, a little too subm-

that stayed the top of the wall, but in a passive fashion and without thrust. Thus were constructed the flying buttresses of the choir of the cathedral of Amiens, erected about 1260. (62). This first attempt was not fortunate. The flying buttresses were too little loaded by their tracery water channels, could maintain themselves around the apse, where they had to abut only the thrust of a single rib of the vault, but in the part parallel to the choir, where it was necessary to resist the combined thrust of the transverse and diagonal arches, t the flying buttresses rose, and in the 15 th century there must be turned above the primitive arches, new arches of greater radius, to neutralize the effect produced by the thrust of t the great vaults. This experience benefited the constructors of the 14 th and 15 th centuries, who thenceforth combined w water channels above the flying buttresses, so as to avoid that dangerous rising. Yet this system of aqueducts especially belongs to the churches of picardy, Champagne and the West, and it is rarely seen employed before the 16 th century in t the monuments of Ile-de-France, Burgundy and the Northwest.

In the 15 th century see how the architect that rebuilt the church of Eu knew how to prevent the rising of the flying buttresses-- only with the superposed small load of the perforated water channels. Instead of setting the piers of the water channel directly on the extrados of the arch (63), as on the choir of the cathedral of Amiens, there war first placed on that extrados a first stone strut A B. This strut is jointed like an inverted platband, so as to strongly resist any rising of the arch produced at the point C by the thrust of the vault; on this first strut, made inflexible, are set the piers of t the water channel, then relieved without danger. By this system the openings D are only struts destined to prevent all d deformation of the arch E C; the arch E C H and its tangent A B only form a homogeneous and perfectly rigid body, because of the opposing forces that neutralize each other by acting in opposed senses. The inflexibility of the first line A B b being opposed to the rising of the arch, the coping F G remains straight and forms the second stone strut, that still resists the upper thrusts of the vault; the figure E C H F G p presents all the resistance of a solid wall without having its weight. These flying buttresses have a double span, and the

and particularly to the shock caused to the edifice by the f fall of the central spire, imprudently built over the transept before the construction of the nave. Besides the flying buttress that we give here belongs to the apse, all whose parts retained their verticality. We cite the choir of Beauvais because it is the final limit to which the construction of t the great churches of the 13 th century attained. It is the theory of the system put into practice with its results even exaggerated. From this point of view, this edifice cannot be too carefully studied. It is the Parthenon of French architecture; it only lacks completion, and to be placed in the midst of a people, conservative and wise like the Greeks of antiquity, to appreciate, respect and extol the grand efforts of human intelligence. The architects of the cathedral of Cologne, who built the choir of that church after that of Beauvais, applied this system of flying buttresses, but perfecting it in regard to execution. They loaded this simple construction with infinite details, that injure its effect without increasing its chance of stability. (Art. Cathedrale). In most churches built at the beginning of the 13 th century, the water f from the gutters of the main roof dripped from the coronas of the cornice, and only rarely was directed into channels destined to promptly conduct it outside the exterior of the edifice,(Art. Cheneau); the inconveniences of that state of things was soon recognized, and toward the middle of the 13 th century, originated the idea of using the upper flying buttress as a channel to carry off the water from the gutters of the great roofs through the heads of the buttresses; thus were a avoided long courses, and were of rainwater the shortest way. This system was adopted in the choir of the cathedral of Beauvais (61). But one was then induced to raise the heads of the top flying buttress up to the cornice of the main roof; i.e., much above the thrust of the vaults as at Beauvais, or to conduct the water from the gutters to the flying buttress by means of vertical stone pices, that had the inconvenience of c causing leaks just at the spandrels of the vaults. The thrust of these upper flying buttresses acting at the topof the wall might cause disorder in the construction. Then toward the end of the 13 th century the upper flying buttresses were replaced by a construction in tracery; an actual inclined water channel

which span the double side aislesare a unique example; ordinarily in the case just mentioned, the flying buttresses have two spans, i.e., they are divided by an intermediate support or resting place, that divides the thrust and destroys a part of its effect, thus permitting the reduction of the thickness of the external buttress.

In the choirs of the great churches built during the 13 th, 14 th and 15 th centuries, the chapels generally present in plan an arrangement so that behind the piers separating these chapels, the walls are reduced to a very small thickness because of the ridial arrangement of the apse (60). If a solid buttress be raised on the separating wall A B, there would c certainly be a rupture at C, for on this weak part would be carried the entire weight of the flying buttress. If one were satisfied to erect a buttress on the resistant portion of that division, for example, C B, the buttress extending from D to 3, especially considering the height of the springings of the v vaults, relatively to the space CC B. At the cathedral of Beauvais, the length A B of the division of the chapels is to the height of the piers D up to the springing of the vaults as 1 : 6, and the length C B as 1 : 9. Then see how the constructors of the 13 th century arranged the flying buttresses of t the choir of that immense church (61). To allow a greater resistance to the abutment of the buttress A C, they were not afraid to corbel the pier A from the pier B, calculating with reason, that the thrust of the two upper flying buttresses t tend to incline this pier A, and transfer its load on its external surface to a vertical over pier B. Leaving a space between the pier A and the buttress C, they turned two other s small flying buttresses as the prolongation of the two large ones, and thus ensured keeping plumb the intermediate pier A loaded by the pinnacle B. By this division of the forces of the thrusts and the stability given to the pier A and the buttress C by the increased weight obtained by means of the addition of the pinnacles D and E, the equilibrium of the entire system is preserved; and if the choir of the cathedral of Beauvais threatened to fall in the 14 th century, so that it w was necessary to erect in the parallel bays new piers between the old ones, it was not due to the system adopted, that was very wisely arranged, but to certain defects in execution, a

of the voussoirs of the arch was not accurately calculated to preserve their curvature. Thenceforth the flying buttresses were curved in a circular arc with its centre placed inside the pier of the nave (57), they thus fulfilled the function of a shore, no longer opposing a passive to an active force, but carried a portion of the weight of the vault while retaining its lateral action, and relieving also the piers A. If for economy or lack of space the buttress B could not have a great thickness, the flying buttress became almost inclined piers, very slightly curved, opposing a considerable resistance to the thrusts, and transmitting this nearly vertical thrust to the buttress. Flying buttresses so constructed are s seen on church Notre Dame of Semur (58), a monument to be frequently cited on account of its beautiful execution and the admirable skill in its mode of construction. However flying buttresses so considered could only maintain vaults of small span (those of Notre Dame of Semur have only 10 ft. span) and whose thrust approaches the vertical because of the acute pointed transverse arches, for they would certainly be overthrown by rotating on their springing D if the transverse arches were nearly round and thus had a thrust at about 45° degrees. In that case, while giving the flying buttress a curve of very great radius and consequently a curve slightly apparent, care was taken to strongly load their springing near the buttress to avoid overthrow. This system was adopted in the construction of the immense flying buttresses of Notre Dame of Paris, rebuilt in the 14 th century (59). These immense arches with not less than 49 ft. radius were erected because of entirely exceptional arrangements (Art. Cathedrale); it is a unique case

All examples just given reproduce only single or double flying buttresses of a single span; but in the choirs of great cathedrals, for example, or in the naves of the 13 th, 14 th and 15 th centuries bordered by double side aisles or by side aisles and chapels communicating with each other, it would be necessary to construct flying buttresses of too great span to cover these spans, if they had to rest on the external buttresses, and these buttresses would have to occupy considerable ground outside the edifices. Now we should not forget, that ground was something to economize in mediaeval cities. We repeat that the flying buttresses of the cathedral of Paris, w

they opened galleries below these windows (Art. Triforium), a and the entire system of construction of the great naves was reduced to slender piers, made rigid by the loads and kept in a vertical plane by means of the equilibrium established between the thrust and the abutting of the flying buttress.

The nave and the upper construction of the choir of the church S. Denis, built under S. Louis, gives us one of the most perfect applications of this principle (55), that we find adopted in the 13 th century in the choirs of the cathedrals of Troyes, Seez, Mans, and later in the 14 th century at S. Ouen of Rouen. The entire science of constructors of churches then consisted in establishing perfect equilibrium between the thrust of the vaults and the thrust of the flying buttresses. And it must be said, that if they have not always succeeded in the execution, the errors committed demonstrate that the system was not bad, since in spite of frightful deformations suffered by some of these monuments, they have stood for not less than six centuries, thanks to the elasticity of this mode of construction. It is also necessary to add, that in great e edifices built with care with sufficient resources and by skilful men, these deformations are not found, and the equilibrium of the construction has been preserved with unusual science and skill.

The curvature of the flying buttress varies according to t the curvature of the transverse arches, the diameter of the flying buttress, its thickness and the thickness of the springing on the buttress.

Thus the primitive flying buttresses are generally formed o of a quadrant (56), but their voussoirs are thick and heavy, they resist the effects of the thrust of the vaults by their weight, and leaning because of this thrust, they add in the piers A a new load to that of the vaults: this is an inert w weight neutralizing an inclined thrust. When one better understands the true function of the flying buttress, it is evident as already stated, that to the inclined thrust may be opposed an inclined resistance without loading the piers by an additional weight, but can even relieve them of a part of the weight of the vaults. Besides it could be seen, that flying buttresses being traced as a quadrant, they rise at the point B when the thrust of the vaults is considerable and the weight

and the coping of the second flying buttress serves as a channel to lead the water from the gutter of the main roof to the lower extremity of the arch, from which it is ejected by gargoyles.(Arts. Cheneau, Gargouille). This means of resistance to the thrusts of the vaults by double flying buttresses did not always seem sufficiently strong to constructors in the 13 th century, they had the idea of combining the two arches by a series of radials connecting them, shoring them and giving them all the strength of a solid wall, while leaving them great lightness. The cathedral of Chartres gives us an admirable example of this sort of flying buttress.(54). The construction of this edifice presents in all its parts a remarkable strength, the vaults have an unusual thickness (about 1.3 ft.) of materials employed being heavy, rough and dense, scarcely lending themselves to the delicacy of Gothic architecture in the first half of the 13 th century. That was necessary for resisting the thrust of these thick vaults of not less than 49 ft. span, to arrange strong abutments in proper caurses; thus in Fig. 7 it is observed that the entire system of the arches p penetrates the buttress, rests there as in a recess, that all the jointing is normal to the curves, finally that it is a c construction entirely oblique and destined to resist loads ac acting obliquely.

This system of shoring arches by means of intermediate radials however does not appear to have been frequently employed during the 13 th century; it is true that there was no need for using such powerful means to resist the thrust of the vaults, ordinarily very light even in the largest Gothic churches. At the cathedral of Rheims the flying buttresses are double, but are independent of each other, they became gradually more daring toward the middle of the 13 th centurw, when piers are more slender and vaults are lighter. Once the principle of Gothic churches was adopted, they soon came to apply it in its most rigorous results. Observing correctly that a vault properly abutted only requires at its springing a vertical s support, very weak in comparison to its own weight, the constructors reduced the piers gradually and referred all power of resistance to the exterior, to the buttresses. (Art. Construction). The completely opened intervals between the piers and under the side arches were filled by great tracery windows;

the two flying buttresses. Below the springing of the vault this projection C B ceased to be useful, so it is no longer supported by a detached column, and the weight of this projection not alting vertically, the constructors were gradually brought to reduce the diameter of the column, whose function was limited to prevent dislocation, to strengthen the construction of piers without loading them; so toward the middle of the 13 th century these detached columns are made of large thin stones set on edge, and may be compared with those timbers termed stays, set rather to stiffen a weak structure than to support a load acting vertically. The high vaults of the choir of the cathedral of Soissons, whose erection dates in the first years of the 13 th century, are abutted by double flying buttresses (52), whose heads rest against projections supported by engaged columns. A passage is reserved between the lower column and the vertical support that receives the imposts of the vaults. It is necessary to note that the last voussoir of each arch is not fixed to the projection, and remains free to slip in case the vault moves because of a settlement of the vertical supports, which is again one of the r results of this principle of elasticity applied to great structures, and without which their stability would be compromised. The possibility of slipping left to flying buttresses prevents their deformation, and it is unnecessary to say, that they can retain all their strength of shoring so long as they are not deformed. Indeed (53), let A B C be a flying buttress and the vertical pier settles, if the arch is fixed at the p point A, it will rupture at B, as indicated by Fig. I. If on the contrary the buttress E settles, the arch being fixed atA, it will rupture as in Fig. II. It is evident how important it is, that the arch can remain free at A to retain the purity of its curve in case of possible slipping. These precautions in the combnation of the jointing of flying buttresses have not always been taken, and the proof that they are not useless is, that their neglect has nearly always produced injurious effects.

The nave of the cathedral of Amiens was erected toward 1230 and presents an arrangement of flying buttresses analogous to that of the choir of the cathedral of Soissons, excepting that both upper and lower columns are detached and are more slender,

knew how to develop this system of construction and how they have abused it.

As we have just stated, it was only at the end of the 12 th century, that the flying buttress frankly shows itself in the religious edifices of the north of France; it only appeared in the middle and south as an importation toward the end of the 13 th century, when pointed architecture, already developed in Ile-de-France, champagne and Burgundy extended through the entire West.

We give first and among the earliest one of the flying buttresses of the choir of the church of S. Remy of Rheims, whose construction dates from the last half of the 12 th century.((50). Here the flying buttress is single, it abuts the vaults at the point of their thrust, and it distributes its resisting force along a vertical line of sufficient length by means of this corbel supported on an external column, leaving a passage between it and the wall above the triforium. But soon the constructors observed that the thrust of cross vaults of great span still acted below and above the mathematical point of t this thrust. Theory can indeed demonstrate that the thrust of a vault is combined at a single point, but practice soon shows that this point is diffused, and that because of the p possible slipping of the voussoirs and the numerous joints, it acts from the springing of the arch to about one half the height of the vault (51). Indeed let A be the mathematical point of the thrust of a cross vault, for example if the vault has a span of 33 to 50 ft., a single flying buttress reaching A cannot prevent the vault from still acting above and below that point. Likewise in shoring a wall that bends, if one is wise, a timber will be set vertically against that wall and two shores above each other to stop that tendency; in the same way the constructors, who erected at the beginniug of the 13 th century the great naves of the northern cathedrals, made a projection from C to B, a true stone timber, and two flying buttresses above each other, the first reaching C below the thrust and the second B above this thrust. By this means the vaults were shored externally, and the flying buttres could not make the least movement, any more than the diagonal arches, the actual point of the thrust acting on a projection kept in a vertical plane and strengthened by the abutting of

continuous half tunnel vaults erected over the side aisles. In some of the churches of Normandy, among others the Abbey aux Hommes and Abbey aux Dames of Caen, the constructors sought a middle term; they erected very thick piers of the great cross vaults of the high nave, and arranging small windows b beneath the side arches of these vaults, they soughtto abut their thrust by a half tunnel vault turned behind the triforium (49). But this half tunnel vault did not reach the point of the thrust of the transverse and diagonal arches, and omitting it between the piers, i.e., in the places where the thrusts of the great vaults did not act, the flying buttress was invented, it permitted opening in the bays windows as wide and as low as possible. The triforium is nothing more than a gallery to which is assigned but slight importance. The side aisle is composed of a ground story and covered by a roof with a single slope. These thick walls then become useless, the n nave piers can remain slender, for the stability of the edifice then consists only in the resistance of the external supports from which spring the flying buttresses. (Art. Contrefort). Two centuries of experiments were required, of frequently unfortunate attempts, to arrive at so simple a solution of the problem, so true is it that the most natural procedures are slow to find, in construction or elsewhere. But as soon as this new way was opened, it was followed with great rapidity, and the flying buttress, scarcely found in the 12 th century, came to be abused in the 14 th century. Some judicious minds wished to conclude from the quick debasement of the great principle of construction of Gothic edifices, that this principle is vicious in itself; yet Greek art, whose purity has never been contested in either principle or form, lasted scarcely twenty years, and Pericles had only just died, when already Athenian architecture reached its decline. On the contrary, we think that in th history of civilization, the arts destined to greatly elevate the human mind are just those, t that suddenly shine brightly to soon be extinguished by even the abuse of the principle, which has quickly brought them to their greatest development. (Art. Architecture).

The requirements that mediaeval architects had to satisfy in erecting their churches, led them to employ the flying buttress almost in spite of themselves; we shall see that they

Until its application in Gothic churches, all was groping; f from the moment that flying buttresses are clearly accented in structures, the construction of churches developed in the true sense and boldly follows the new way. To require a Gothic church without flying buttresses is to demand a ship without a keel, it is for the church as for the ship a question of existence or non-existence. The problem that the architects of the Romanesque epoch had to solve was this:-- to erect vaults over the antique basilica. In arrangement of plan, the antique basilica entirely satisfied the programme of the Latin church; great open spaces, slender supports, air and light. But the antique basilica was covered by carpentry, the apse alone being vaulted; now in our climate the carpentry does n not entirely protect from snow and wind: it decays rapidly u unless is employed the modern system of metal gutters, leaders etc., methods that could only be employed among a people, with whom the art of metallurgy had attained a high degree of perfection. Further, carpentry burns, and on edifices covered o only by carpentry that fire devours is a building lost from base to ridge. Until the 10 th and 11 th centuries is only a question in the written documents of our history, of the building of churches that required an entire rebuilding. The great purpose of the clergy and consequently of the architects, who built the churches, was from the 10 th century to vault the naves of basilicas. But the (clearstory) walls of basilicas supported by slender columns could not offer sufficient resistance to the thrust of high or low vaults. In the middle of France the constructors toward the 11 th century adopted the method of omitting the windows at the top of the nave walls, and they abutted the tunnel vaults of these high naves, either by half tunnel vaults as in most churches of Auvergne, or by small cross vaults raised over the side aisles. The naves could then only be lighted by windows of these side aisles a almost as high as the great naves. The external walls were t thick and strengthened by buttresses, and resisted the combined thrusts of the great and small vaults. (Arts. Eglise, Voute). But in north France this system could not prevail; great centres of population required vast churches, light was necessarw and must be taken directly through the nave walls, consequently renouncing the abutting of the higher vaults by con-

four piers and made the choirs more open; however this arrangement does not reassure the eye like the succession of concentric arches projecting beyond each other and resting on a single arch at the intrados.

From the 13 th to the 16 th centuries transverse, diagonal and side arches are ornamented only by mouldings, save some very rare exceptions; thus in the chapels of the choir of S. Etienne of Caen, that date from the beginning of the 13 th c century, the diagonal arches are decorated by indents (47), but it must be said, than in Normandy these kinds of ornaments remaining from Romanesque architecture are by reason of a special taste, because of the ease with which the stone of C Caen is cut, encroaching on pointed architecture until toward the middle of the 13 th century.

During the 12 th century in Burgundy and Ile-de-France, transverse and diagonal arches are still seen decorated by sawteeth, diamond points, broken rounds (48); chapter hall of church of Vezelay, porch of church S. Denis, etc. The diagonal arches of the choir of S. Germer are covered by rich ornaments.

At the end of the 15 th centuryand during the 16 th century ornaments are again applied to transverse, diagonal and side arches, but then these ornaments project strongly beyond the mouldings; the choir of the church S. Pierre of Caen is one of the richest examples of this kind of decoration applied to the arches of vaults; but it is an abuse of ornamentation, t that we cannot blame too much, in that it destroys the purity of lines, which charms in diagonal arches, that it makes heavier and causes fear of their fall.

ARC-BOUTANT. Flying Buttress.

This is an external arch, that by its position is destined to resist the thrust of the cross vaults. Its impost rests on the buttress, its upper end being at the point of the combined thrust of the transverse and diagonal arches. According to the taste of each school, the system of flying buttresses has been much blamed and much praised; we do not undertake to defend them or to emphasize their inconveniences; there is only to be said in our opinion concerning this system of construction, that it is the frankest and most energetic expression of the method of construction adopted by mediaeval constructors. Im-

the external enclosure of the edifice; there is in this arrangement something logical, that reassures the eye by making t the system of construction intelligible to all. As the figure (45) indicates, it is evident that as the transverse, diagonal and side arches intersect each other at their springing, so a as to rest on a narrow impost, and thus to carry the entire thrust of the vaults to a point made immovable by means of the abutting of the flying buttress; but in the vaults of the side aisles, there is a different problem to solve, it being necessary to have these archivolts thick enough to support t the walls of the nave (clearstory); the piers are then made as slender as possible to not obstruct the view, and not only have to support the springing of these archivolts, but also those of the transverse and diagonal arches. The intersections of these arches, whose depths and widths are very different, then presents difficulties at their springing from the abacus of the capital. These are conquered after the 13 th century with remarkable skill, and we give here as a proof the arrangement of the springings of archivolts, transverse and groin arches of the side aisles of the choir of the cathedral of T Tours, 13 th century (46). The archivolt A is as thick as the pier and is stilted, so as to be able to penetrate the vault above the springing of the diagonal arch B, and its last rows of voussoirs transfer the weight of the wall to the impost of the transverse arch C; thus the diagonal arch and the vault itself are independent od the main construction, which may s settle without rupturing or chushing the lighter construction of these vaults and diagonal arches. (Art. Voute).

At the junction of the transept with the nave and choir of churches during the Romanesque and pointed periods, great strength was given to the transverse arches, both for resisting the pressure of the walls, as well as frequently for supporting towers or central spires. Then the transverse arch is composed of three, four or five rows of voussoirs, as at the cathedrals of Rouen, Beauvais, Bayeux, Coutances, Eu, etc. Particularly in Normandy, where the crossing of churches was always covered by a central tower, the great transverse arches have two rows of voussoirs placed side by side at the intrados instead of a single one, as practised in Ile-de-France, B Burgundy and Champagne; that permitted less projection at the

(compartment) of the vault. These projections served for setting the wooden curves required to support the courses of rubble forming the filling. (Art. Voute). It must be stated here that neither diagonal, transverse nor side arches are ever c connected with the rubble filling, only supporting its springing like wooden centres; that is a rule that the constructors of Romanesque or Gothic edifices never depart from, for it is imperatively imposed even by the nature of the construction of these kinds of vaults. (Art. Voute). During the 15 th century transverse and diagonal arches as well as archivolts come to intersect the piers supporting them by omitting the capitals. Sometimes the sections of these arches are extended on the piers to their bases, or they die on the cylindrical or prismatic surfaces of these piers, thus passing from the vertical line to the curve without stops or transitions. These penetrations are always executed with a perfect understanding of drawing. (Arts. Penetration, Projections).

The side arches are bonded in the surface of the wall, and their section is half the diagonal or transverse arch (43); they present only a projection necessary to receive the edge of the filling of the vault. Often after the 13 th century, they extend through the thickness of the wall, forming a discharging arch and archivolt on the exterior above the tracery of the windows (44). S. Denis, Troyes, Amiens, S. Ouen of Rouen, etc. The vaults of the churches of Burgundy built during the 13 th century present a remarkable peculiarity; their side arches are separated from the walls and are independent, supporting the vaults and the carpentrw of the roof. The walls then are no more thau thin enclosures, a sort of partition p pierced by windows and bearing the end of the gutters by means of a discharging arch.(45). This arrangement offers many advantages, it obviates the injurious effect of leaks in the gutters, which cannot then cause efflorescence on the walls, since the gutters are ventilated underneath' it permits abutting the vaults by internal buttresses, that resist with greater certainty the thrust of the flying buttresses; it gives all facilities for opening in the walls windows as high and wide as possible, these not being compelled to stop beneath the side arches. Further the appearance of these vaults is v very happy, visibly supported by the piers and independent of

ornaments. (35). Sometimes these transverse arches take in s section the form of a half cylinder, as in the crypt of church S. Eutrope of Saintes (36). The naves of the cathedral of Autun, of the churches of Beaune and of Saulieu, which date from the first half of the 12 th centurw, have pointed tunnel vaults, the transverse arches being composed of two rows of voussoirs, the second being decorated by a moulding or round on the the angles (37), cathedral of Autun. The nave of the cathedral of Vezelay precedes that epoch, and presents round arches, the vaults being cross vaults, but without groin arches. (38). In secular edifices of the 12 th century, transverse a arches are usually simple, sometimes only chamfered on their angles (39); toward the end of the 12 th century transverse arches commence to be composed of a group of rounds separated by hollows, cathedral of Paris (40), churches of S. Julien-le-Pauvre, S. Etienne of Caen, Bayeux, etc. But as one can see i in the cathedral of Paris, the transverse arches are there t thin and narrow, formed of a single row of voussoirs, without much more projection or thickness than the diagonal arches w with which their sections combine. Toward the middle of the 13 th century transverse arches take two and even three rows of voussoirs, thus acquiring a resistance much greater than the diagonal arches, which never consist of more than one row of voussoirs. The sections of these arches are then modified and follow the changes previously observed in the archivolts of naves. We give here a section A of a transverse arch and section B of a diagonal arch of the S. Chapelle of the P Palace (41); these forms of arches are found with some unimportant variations in all the edifices of this epoch; such as the cathedrals of Amiens, Beauvais, Rheims, Troyes, church of S. Denis, halls of the Palace, hall of Synod of Sens, etc. ; the sections of these arches are still retained during the 1 14 th century, but are leaner, more hollowed, more refined in details of the mouldings.

But in the 15 th century, rounds with or without projecting angles are abandoned to adopt prismatic and angular forms with great hollows. Transverse and diagonal arches detach themselves from the vault (42)' the greatest projection of their sections exceeds the width of the extrados, and this was covered by the method used for constructing the filling (Art. Compart-

afterward, having no uniform projection nor that unity of appearance, that in the portals of the 13 th and 14 th centuries so accent the lines of archivolts, and leave them such great vigor, in spite of the multiplicity of details with which they are charged.

ARCHIVOLTES DES PORTES. Archivolts of Doorways.

All doorways of the Romanesque and pointed periods, with s some exceptions belonging to Poitou and Saintonge, being spanned by a lintel, the archivolts are merely discharging arches, that prevent the weight of the masonry from breaking these l lintels. The mouldings decorating these archivolts suffer the same transformations as those of portals; the round arch persists in archivolts of doorways; it is seen still employed until toward the end of the 13 th century for openings of small dimensions, when a pointed arch predominates everywhere without mixture. (Art. Porte).

ARCHIVOLTES DES FENETRES. Archivolts of Windows.

These remain round arches until during the 13 th century in the southern and middle provinces; adopt the pointed curve in Isle-de-France toward the middle of the 12 th century. In Normandy, Burgundy and Champagne, about from 1200 to 1220.(Art. Fenetre). During the pointed period, they are generally set directly below the side arches of the vaults and are sometimes even confounded with them; examples in Cathedralsof Amiens, Bourdeaux, Troyes, Rheims, etc.

ARC-DOUBLEAUX, ARC-OGIVE, ARC-FORMERET. Transverse, Diagonal and Side Arches.

The transverse arch extends from one pier to another in vaulted edifices, thus forming a projecting rib in tunnel vaults, (33), or it separates two cross vaults. We give here the plan of a cross vault, so as to designate by their names the different arches composing it (34). Let E F and G H be the two w walls; A B and C D are the transverse arches; A D and C B, t the groin arches; A C, B D, the side arches.

Vaults are built as tunnel vaults until toward the beginning of the 12 th century; transverse arches then consist of one or two rows of voussoirs, generally with neither mouldings nor

century, archivolts of portals are round; they only adopt the pointed form toward the middle of the 12 th century, except in some provinces where the round arch persists until during the 13 th century, especially in Provence, Lyonnais and Burgundy. In Isel-de-France and the middle during the 11 th century, they are characterized by great sobriety in ornament, w while in Normandy, Burgundy, Poitou and Saintonge, they are covered by an incredible profusion of interlacings, figures and rosettes, particularly during the 12 th century; in Normandy geometrical ornaments predominate (24), church of Than near Caen (12 th century). In Provence are delicate mouldings with flat ornaments carved with refinement. In Languedoc and Guyenne is a multiplicity of mouldings and few ornaments (25), church of S. Sernin of Toulouse, church of Lanpiac (26); south portal of church of Puy-en-Velay (27). In Poitou and Saintonge eccentric figures, animals, interlaced stems of leaves, or b beads, disks, diamond points, delicately cut, sawteeth, small square mouldings separated by dark hollows; church of Surgere (28). In Burgundy are rosettes and symbolical personages; portal of church of Avalon (29). By examination of these examples belonging to the 11 th and 12 th centuries is apparent what wealth of decoration, mouldings, ornaments or figures is contained in rectangular recesses. Until the 15 th century architects scrupulously retained that principle. Thus toward the end of the 12 th century and during the 13 th and 14 th centuries, archivolts in the portals of the great northern cathedrals are almost always charged with figures, each carved in a voussoir; these figures are contained in the recesses of t the voussoirs; we give an example (30) taken from the south portal of the cathedral of Amiens, 13 th century; A indicates the section of the voussoir before carving. Likewise if the archivolt be composed of mouldings with or without ornaments, the primary form of the voussoir is recognized (31); lateral doorway of S. Nazaire de Carcassonne, 14 th century.

In the 14 th century this method changes; archivolts of portals are set with the moulding a hollow, that is to receive the figures; this hollow only bears the canopies and supports the statuettes, and these are fixed later by an anchor set in the bottmo of the moulding (32); portal of Notre Dame of Semur There these statuettes are carved in the workshop and fitted

accented mouldings during the 13 th century; these mouldings successively develop and end py causing the voussoirs of the arches to lose that rectangular appearance in section, that they had retained until then. We give here the transformations that archivolts of naves suffered from 1200 to 1500; cathedral of Paris, S. Pierre of Chartres, etc. (15), 1200 to 1230); o cathedral of Tours (16), 1220 to 1240; cathedral of Nevers ((17), 1230 to 1250. In this case the carpentry centre requir- ed for setting the inner row of voussoirs must be double. Ot- her examples of the same epoch (18, 19) with outer arch proj- ecting beyond the face of the wall, S. Pierre-sous-Vezelay, 1240 to 1250. Cathedral of Paris (20), 1320 to 1330; cathedral of Narbonne and of Clermont (21), 1340. The profiles are hol- lowed more and more as they approach the 15 th century; S. S Severin, Paris (22), 15 th century; church S. Florentin (23), beginning of the 16 th century. Toward the end of the 15 th century, the sections of arches and their curves are nearly identical in all the monuments erected at that epoch.

ARCHIVOLTES DE CLOITRES. Archivolts of Cloisters.

They retain the round form very late, until toward the end of the 13 th century in the middle and south of France. (Art. Cloitre).

ARCHIVOLTE DE PORTAILS. Archivolt of Portal.

Gable walls of the facades of churches being always very t thick, the doorways are necessarily covered by a succession of superposed arches. These archivolts in Romanesque edifices sometimes present four or five rows of voussoirs, a still gr- eater number in edifices built during the pointed period; the walls of the last monuments, because of their height and thi- ckness, must be borne on very strong arches; now as the media- val constructors had the method, when they would resist a st- rong pressure, not of increasing the depths of the voussoirs of their arches, but of multiplying the number of these arch- es, also an excellent method (Art. Appareil), it results that they superposed as many as six, seven or eight concentric ar- ches above the lintels of the portals of their facades. This series of archivolts are decorated with more or less luxury, according to the richness of the edifices. During the 11 th

ARCHIVOLTS. Arches. Archivolts.

These arches connect the piers of aisles or cloisters, jambs of portals, porches, doorways and windows, and support the w weight of walls. Archivolts during the Romanesque period until the 12 century are round, sometimes being stilted, very rarely horseshoe. They adop the broken curve termed pointed from the beginning of the 12 th century in Isle-de-France and Champagne; toward the end of the 12 th century in Burgundy, Lyonnais, Anjou, Poitou, Normandy; only during the 13 th century in Auvergne, Limousin, Languedoc and Provence. — Archivolts opening on the side aisles. -- They are generally composed of one or two rows of simple voussoirs (8) without mouldings during the 11 th century; sometimes the second row of voussoirs toward the end of the 11 th century, as in the nave of the abbey-aux-dames at Caen (9), is ornamented by broken rounds, frets on a simple round (10). The intrados of the arch is always plain, that must rest on the carpentry centre during construction. The ornaments decorating the second arches vary according to the provinces, they are almost always borrowed from geometrical forms in Normandy, from antique traditions in Burgundy ((11) (nave of abbey church in Vezelay), in the Maconnais, Lyonnais and Provence. Especially during the 12 th century archivolts were covered by ornaments; the internal arch still r remained simple or merely relieved at the angles by a round inscribed within the square section of the voussoir, so as not to interfere with setting on the carpentry centre (12) (nave of Cathedral of Bayeux). The rows of voussoirs increased even reaching three. Isle-de-France is sparing with ornaments on its archivolts and lavish with mouldings(13), while the middle of France remains faithful to tradition, long retaining until the beginning of the 13 th century its two rows of voussoirs, that simple interior, while adopting the pointed arch (cathedral of Autun) (14). But the ornaments gradually disappear from the archivolts of the naves and are replaced by mouldings more or less complex. In Normandy the broken rounds and sawteeth are seen to persist on archivolts until during the 13 th century. In Burgundy and Maconnais, sometimes also billets, diamond points, rosettes and discs; in Provence eggs, scrolls, details, all ornaments borrowed from antiquity. The intrados of the inner arch begins to receive very much ac-

middle ages. Arches employed in this period are classed in t three great kinds; round arches formed by a semicircle; depressed or oval arches formed by a half ellipse, major axis at the base (2); pointed arches composed of two circular arcs i intersecting, producing a curved angle more or less acute at the top, according as the centres are more or less distant f from each other (3). Round arches are sometimes stilted (4) or horseshoe (5), segmental when the centre is below the springing (6). Until the end of the 11 th century, the round arch with its variations is the only one employed in structures, with some rare exceptions. As for the depressed arches frequently found in the vaults of the Romanesque period, they almost always are only the result of deformations produced by the s spreading apart of the walls (7), having been constructed originally as round arches. During the 12 th century formed of two circular arcs (and that we term pointed (third point) arches conformably to the term accepted in the 15 th and 16 th centuries) was successively adopted in the provinces of France and in the entire West. This arch is actually only the result of an entirely new principle of construction (Arts. Construction, Ogive, Voutes); of a combination of vaults that may be regarded as a modern invention, abruptly breaking with antique traditions. The pointed arch disappeared with the last traces of the art of the middle ages about the middle of the 16 th century; it is so inherent in the construction of the modern vault, that it long remained in the construction of these vaults, when already in all other parts of the architecture, t the forms borrowed from Roman antiquity had been successively adopted. The architects of the Renaissance desiring definitely to exclude this form of arch,found nothing better than to substitute, as at S. Eustache toward the end of the 16 th century, elliptical arches with minor diameter at the base: a disagreeable curve, difficult to draw, more difficult to cut, and less resistant than the pointed arch.

Besides the preceding terms that distinguish the varieties of arches employed in the construction of mediaeval edifices, arches are designated by different names according to their p purposes; these are archivolts, transverse arches, diagonal arches, side arches, flying buttress, discharging arches.

X fastenings applied to sills is generally abandoned; the sills are only supported above the sills of the frame by little vertical posts often enriched by sculpture, between which are placed panels more or less decorated; here is an example (10) from another house in Rouen, Rue Grand Horloge.(Art. Maisons). The name of cap (Art. Allege) is also given to the slab crowning a solid or open balustrade. (Art. Balustrades).

ARBALETRIER. Principal Rafter.

An inclined member in carpentry, that in a roof truss has its lower end fixed in the tie-beam, the upper end being at the top of the king post. The principals form two sides of t the triangle with the tie-beam as base. In the old visible f framework the interior was covered by boards or a tunnel vault forming a ceiling, the principals supporting cross pieces that receive the curves beneath which are nailed the boards of the vault (1). The principals support purlins receiving t the rafters in the framework before and after the Gothic period; but during the 12 th, 13 th, 14 th and even the 15 th centuries, the principals are in the same plane as the rafters, and like them support the strips or battens that receive the covering. In the framework not visible for great roofs o over vaults, the principal is sometimes stiffened by an under principal designed to prevent bending in its longer span (2). In half trusses with single slope that cover the side aisles of churches, and in general it forms a roof with a single eave, the principal being a timber forming the greater side of a r right-angled triangle (3). (Arts. Ferme, Charpente).

ARBRE. Arbre. Centre Post.

This name is often given to the central post of wooden spires. (Arts. Poincon, Fleche).

ARBRE DE JESSE. Tree of Jesse. (Art. Jesse).

ARC. Arch.

This name is applied to combinations of stones, rubble or bricks, intended to span a space more or less great by means of a curve. This process of construction was adopted by the Romans, then was developed again by the architects of the mid-

of the 13 th century, sills cut in that manner (2). In edifices of the Romanesque period from the 11 th to the 12 centuries, these precautions are not employed; the sills of the windows are them only a simple horizontal slab (3), as in the s side aisles of the church of Vezelay, for example, or cut beveled on both sides, externally to aid the water to run off, internally to admit the light (4). (Art. Fenetre). In churches built during the first half of the 13 th century the sills frequently form a sort of thin wall beneath the mullions of the upper windows, at the height of the roof being placed behind the trifomium on the side aisles; thus are arranged most upper windows of Burgundian edifices built from 1200 to 1250, notably those of the church of Semur in Auxois (8), a drawing of which is given. This sill, against which abuts the roof of the double side aisles of the choir is no more than 0.5 ft. thick. This sort of sill is also common in Normandy, and the nave of the church of Eu gives a beautiful example.

In the civil architecture of the 12 th and 13 th centuries the sills of the windows almost always form a continuous belt, as one may see in a great number of houses of Cordes, S. Antonin, on the facades of the Romanesque house of S. Gilles (6), that of musicians at Rheims, and charming houses of the city of Cluny. Later in the 14 th century the sills form a projection with drip before each window (7), and they are sometimes stopped under the piers. In civil edifices and houses of the 15 th century, they no longer have drips and form a horizontal projection moulded at its ends, so as to offer an easier place for leaning to persons at the window; we give here an example taken from the city hall of Compiegne (8). This arrangement only ceases toward the end of the 16 th century, when the stone sills are replaced in secular architecture by sill bars of wrought iron. The windows of wooden houses of the 15 th a and 16 th centuries in existence have sills connected to the jambs, and give strength to the half timber work by a series of X-crosses that secure them. The half timber facades of houses of the 16 th century are usually only frames composed of posts, which are kept vertical only by means of combination with the woodwork of the sills. Here is an example of a sill taken from a house built during the 15 th century at Rouen, Rue Malpalu (9). At the beginning of the 16 th century, this

There still exists in the south side aisle of the choir of W Westminster abbey church in London a great reredos of the 13 th century executed by these processes; we cite it here because it belongs to the French school of that epoch, and it must have been made in Isle-de-France. (Art. Retable). The monk T Theophilus in his "Essai sur divers Arts", Chaps. 17, 18, 19, describes the processes employed in the 12 th century to overlay vellum and stucco on woodwork intended to ornament reredoses, altars, and panels. It appears that from the time of the monk Theophilus colored glass was applied by burning on stained glass, so as to represent the precious stones in the borders of garments without the aid of leads. So far as we know, there no longer exist examples of glass made in this manner; it is true that the stained glas of the 12 th century is very rare today. (Theoph. persb. et monach. Diversum artium schedula).

APPUI. Window Sill.

This is the upper slab of the panel below windows (Art. Allege); supporting bars are also termed the pieces of wood or iron fixed in the jambs of windows, that permit one to look out, when the windows are opened down to the level of the floor. Supporting bars are rarely in use before the 16 th century, or if they existed, they consisted of a simple cross bar without ornaments. By extension the name of window sill is g generally given to the course of stone set below the window in edicices, religious, military or civil, even when these w windows are very high above the ground. The sill in edifices erected from the 13 th to the 16 th centuries is always arranged so as to prevent the rain from running down the internal surfaces, which strikes against the glass. It ordinarily has outside a strongly inclined slope, a drip and an inside rebate that stops the water penetrating through the crevices of the glass and compels it to run outside (1). Sometimes the sill has a little channel inside with one or two openings intended to lead rainwater outside, or the drip that forms on the glass This arrangement emphasizes the care taken in the least details of construction, and is especially applied to the sills of the windows of houses. One notes in most of the windows of the towers of the city of Carcassonne, which date from the end

in the epoch of S. Denis.

As for facings of glazed terra cotta, they have become very rare, being especially employed in secular edifices and private houses; yet we will cite as an example a wooden house in Beauvais from the end of the 15 th century, all the facings of which are decorated by glazed terra cottas of various colors. From the 12 th century overlays of relief stucco are frequently found on statues and delicate parts of the internal architecture. These overlays are composed of a coating of very thin lime on which, while still soft, were stamped delicate ornaments of slight projection by means of a stamp of wood or iron. Thus were ornamented the garments of statues, the grounds of reredoses of altars (Art. Retable), architectural members of rood screens and enclosures, also sometimes the woodwork intended to be painted and gilded; for it is needless to say that the relief obtained by such a simple process always received gilding and painting to give it consistency and ensure its d duration. We present here (1) an example taken from the coverings of golded stucco, that cover the arcades of the sanctuary of the S. Chapelle; this engraving is half size and can show how delicate are these reliefs. Not only in interiors were a applied these stuccos; in the portals of churches of the 12 th and 13 th centuries are found traces of these overlays on the garments of statues. At the cathedral of Angers, on the robe of the Virgin on the north portal of the cathedral of Paris, the borders of draperies are decorated by stuccos. In the 15 th century the coating of lime is replaced by one of resin, which scales off and disappears more quickly than the lime. Restorations made at that epoch in the S. Chapel of the Palace present some visible traces of overlays, not only on the garments of the statues, but even on columns, on the surfaces of walls; these were large fleurs-de-lis, monograms of Christ, stars with wavy rays, etc.

During the 12 th, 13 th and 14 th centuries overlays were applied on wood, on vellum made flexible by soaking in water, by means of a layer of glue or of cheese! on this overlay, that took all the forms of the mouldings, was spread also an overlay in relief by the processes indicated above; then it was gilded, painted, decorated by glass painted on the underside, actually fixed by setting thin in decorated stucco. (Art. Fixe).

at the beginning of the 17 th century, overlays of copper covered by gilded and painted ornaments. The principal portals of the facade were covered by overlays of sheets of enameled copper and ornaments of gilded bronze. (Sroblist, Vol. 1. p. 240, et seq. Paris. 1625).

Our mediaeval monuments were completely changed in the last century and were radically devastated in 1793; we see today only their stripped walls, still fortunate when we do not reproach them with that nudity. Whitewash and dirt have replaced paintings; fastenings torn away and hammer marks are the sole traces indicating the overlays of metal, that decorated tombs, enclosures and altars. As for less precious materials, that did not tempt the cupidity of the reformers, numerous fragments of them are found. Among the overlays most frequently employed from the 12 th century till the Renaissance may be cited glass, glazed terra cotta and stuccos in relief. Marbles were rare in north France during the middle ages, and colored glass frequently replaced that material; it was used for the grounds of reliefs, arcades, tombs, altars and reredoses; it also ornamented the interiors of palaces. S. Chapelle of Paris has left us a complete example of this kind of overlays. The arcade forming the entire internal base of this chapel contains subjects representing martyrs; the grounds of a part of these paintings are filled by blue glass overlaid on sheets of silver, and enhanced externally by very delicate gilded o ornaments. Thin glass of a strong tint is made brilliant by t presence of silver beneath, and by gold scattered on its surface, and it has the effect of enamel. All the open parts of the arcade, the grounds of the carwed and gilded angels holding crowns or censers are likewise incrusted with glass of b blue or shell color, enhanced by foliage and lattices of gold. A decoration of richer appearance cannot be conceived, although the means of execution are neither expensive nor difficult. Sometimes also these are white glass overlaid on delicate paintings to which is given the splendor of an enameled gem. Th There exists still at S. Denis numerous fragmants of an altar with ground entirely covered by this thin white glass overlaid on paintings almost as dalicate as those decorating the margins of manuscripts. These simple processes were in use during the 13 th, 14 th and 15 th centuries, but more particularly

ages in the East, Italy and the entire West. The mosaics with gold grounds were even substituted for paintings on the surfaces of vaults and walls as being more durable and richer. — Gregory of Tours cites some churches built in his time, that were decorated internally by paintings and mosaics, among others the church of Chalons-sur-Saone erected by the care of b bishop Agricola. These examples of application of mosaics, so common in Italy and Sicily, have become very rare in France, and we scarcely know more than one specimen of an apsidal vault ornamented by mosaics, which is found in the little church of Germigny-les-Pres near S. Benoit-sur-Loire, and that appears to belong to the 10 th century. From the Carlovingian epoch until the 12 th century the clergy in France were not rich enough to ornament its churches by such expensive processes; they were especially and rationally occupied in founding great agricultural establishments, in civilizing the people, in struggling against the rather disorderly spirit of feaudalism. But during the 12 th century having become wealthier and possessing vast properties, they thought of employing their superfluous resources in sumptuously ornamenting the interiors of the churches. On its part the royal power already disposed of considerable resources, a part op which could be devoted to ornamenting its palaces. The vast extent then compulsory for churches no longer allowed the interior to be covered by marble and mosaics; besides this mode of ornamentation could not be applied to the new style of architecture adopted; painting alone was proper for decorating vaults, piers composed of groups of columns, the moulded arches. The overlaying of rich materials in stone or wood was henceforth reserved for altars, reredoses, rood screens, tombs, enclosures, and finally for all parts of religious edifices, that by dimensions or purpose allowed the use of precious materials. Suger had the rood screen of the abbey church of S. Denis ornamented by the overlaying of bronze ornament and ivory figures. Frequent mention is made of tombs and of altars covered by sheets of enameled copper or gilded silver. Before the revolution of 1792, there still existed in France a great quantity of these objects (Art. Tombeaux), that have disappeared today. On the backs of the stalls of the same church of S. Denis dating from the 13 th century, may still be seen from the time of M. Doublet

in cross vaults, anchored to the woodwork.

In closing, we state this principal fact, that summarizes all the detailed observers contained in this Article. From the 11 th to the end of the 14 th century, when the decoration of edifices produces horizontal lines, the construction is horizontal; when it gives vertical lines, the construction is vertical; the jointing naturally obeys this law. In the 1½ th c century the decoration is always vertical, horizontal lines are rare and scarcely indicated, and yet the construction is always horizontal, i.e., in manifest contradiction to the form adopted.

APPENTIS. Shed.

This name is given to certain wooden structures attached to public or private edifices, whose roofs have only one slope and gutter; the shed always has a temporary character, being an annex to a completed structure, erected on account of a new need to be satisfied, or permitted to be built by sufferance. Yet today a great number of our public edifices, particularly our cathedrals, are surrounded by sheds built against their basements between the buttresses. These parasitical structures became one cause of the ruin of monuments, and it is useful to remove them. They have also been erected sometimes to cover external stairways, such as the shed built in the 15 th century against one of the walls of the great chapter hall of the cathedral of Meaux (1); to protect the entrances or to p place covered steps outside certain great secular edifices.

APPLICATION. Application, Incrustation, Overlay.

By this word in architecture is designated the placing of precious or ornamental materials on stones, bricks, rubble or wood. Thus one speaks of the application of a covering of paint on a wall; the application of metal sheets on wood, etc. In Grecian antiquity was nearly general the application of v very fine colored stucco on stone in temples and houses. In the Roman period these very fragile coverings were often replaced by slabs of marble or porphyry, that were applied by m means of very adhesive cement to the surfaces of walls of brick or rubble. This mode of decorating the interiors of edifices was still in use in the first centuries of the middle

to allow the use of lintels in one piece.

From the Roman period until the 15 th century exclusively, edifices were not dressed after erection, stones were not set in block, but were completely cut and finished. All must then be foreseen by the stonecutter on the stone yard before setting. Thus a joint was never awkwardly intersected by a relief, ornament or moulding. Proofs of this interesting fact abound:-- 1, the marks of workmen found on the stones; 2, the tooth marks differing on each stone; 3, the inmpossibilitw of hollowing certain mouldings or sculptures after setting, for example in Fig. 8; 4, the traces of grounds of mouldings in the joints below the ornaments (25); 5, the errors in measurements, that have compelled the setters sometimes to cut off part of a leaf or sculpture to fit in place a stone cut in the yard; 6, the combinations and intersections of the mouldings of tracery, that it would be impossible to finish in place if the stone were only set in block; 7, and finally, the very frequent examples of undinished edifices, but where the stones last set are entirely finished in cutting or sculpture.

In the 15 th century the system of jointing was thoroughly changed. The desire to produce extraordinary effects, the profusion of ornaments, the intersection of mouldings prevailed over logical jointing based on the nature of the material employed. Then the ornamentation often controlled the construction in spite of the height of the layers; there resulted from this frequent cracks in beds or joints, considerable waste of stone, artificial means to ma ntain those vast perforated gables, and corbellings; iron came to the aid of the constructor to fasten those decorations, that could not remain without i its help or by the natural rules of statics. Yet again one n never sees an ornament cut by a bed, cornices are made in the height of a course, arches have extradoses, the tracery is c cut after the method employed by former constructurs, although affecting forms very difficult to harmonize with the ordinary properties of stone. One can only point out the trrocities so common a century later, where the architect of the chateau of Ecouen jointed columns in two blocks set on end with a vertical joint in the entire height, or as at the chateau of Gaillon, where it was found ingenious to turn arches on corbels suspended in the air, or there were lavished those pendants

The pointed arches of the vaults of the porches are composed of slabs receiving on a projection the triangles of these vaults, and rise above them and are cut to bear the slabs of t the covering like the valleys of a wooden roof. It seems that the architect of this charming edifice, in the arrangement of the jointing of his structure, sought to economise as much as possible the cut stone. Yet this church bears its five hundred years without its construction having notably suffered, in s spite of the carelessness of stupid restorations. The ingenious manner in which the jointing was conceived and executed has preserved that edifice from ruin, that its excessive lightness seemed to soon cause necessarily. The study of the jointing of mediaeval monuments cannot be too strongly advised; it is indespensable, when it is desired to restore them without compromising their stability, and is always useful, for that practical science has never produced more surprising results with simpler means, with the most perfect knowledge of materials, of their resistance anf properties.

In edifices of the 11 th to the 16 th centuries, lintels a are generally employed only to cover small openings, and then are of a single stone. Particularly in secular edifices, where windows and doors are almost alwayu rectangular, the lintels are high, sometimes cut in triangulan form (19) to better resist pressure, or supported near their ends by corbels set in the jambs (20). When these lintels must have great length, as on fireplaces whose mantles often have spans of 13 to 16 ft., the lintels are jointed as platbands (21) with plain or indented joints (22), or are indented (23). Constructors then knew the jointed platband, aud if they employed it only in exceptional cases and when they could not do otherwise, they had r recognized the inconveniences of this kind of jointing. Besides there exists on the banks of the Rhine, where the red sandstone of the Vosges supply very strong and tough materials, a great number of jointed platbands in edifices of the 12 th, 13 th and 14 th centuries. In the part of the castle of Coucy dating from the 15 th century may yet be seen vast rectangular windows with lintels of not less than 13 ft. span, cut iy voussoirs without any ironwork to prevent slipping. But there are exceptions; circular arcs are always preferred by the old stonecutters (24), from the moment that the spans are too great

each other (16). Like a combination of wooden planks centered flatwise and concentric, that presents a greater resistance t to pressure because of their elasticity and numerous surfaces, than a homogeneous timber of dimensions equaltto the pile of planks; so these rows of voussoirs superposed and with extrados doses ase more resistant, and particularly retain their curvature when settlements or movements occur, than a single row of voussoirs with depth equal to that of the rows of voussoirs together. We should add that the boints of voussoirs of a arches are always normal to the curve. In arches composed of two circular arcs, commonly termed pointed, all joints of voussoirs radiate from the centres of each arc (17), so that in lancet arches the debs of voussoirs have beds little inclined to the horizon (18). That is why these arches offer such great resistance to pressure and thrust so little. The intersection of the two arches is always divided by a vertical joint, there is no keystone, properly speaking; indeed it would not be logical to place a keystone at the intersection of two arches abutting against each other at top, and the pointed arch is nothing else.

The final expression of the principle just stated is found in edifices of the 14 th century. The jointing of the structural members supporting vertical loads essentially differs f from abutting structures, or that contribute to the ornamentation. Church S. Urbain of Troyes gives a very remarkable example of the application of this principle in all its logical rigor. The structure of this church actually consists only of buttresses and vaults; the buttresses are constructed of low courses set on bed; as for the flying buttresses, they are o only stone struts and not arches composed of voussoirr, the spaces between the buttresses are merlely openings in stone like great sashes set in rebates between the buttresses; the gutters are slabs resting on the heads of the buttresses and supported in their spans by stone corbels forming perforated gables, like the wooden gable under a lintel; the decorations on the faces of these buttresses are only stone facings set on edge and bonded to the body of the construction at intervals by courses forminm a part of that structure. The walls of the side aisles are only partitions pierced by square windows with mullions, separate from the side arches of the vaults.

set on beds, while all facing, ornamentation, mullions, rose windows, balustrades, galleries, are erected in materials set on edge, a sort of stone scaffolding independent of the skeleton of the edifice, that could be destroyed or replaced. Nothing better demonstrates this principle than the study of t the jointing of one of those great rose windows of stone, that opens beneath the vaults of naves and transepts. These rose windows, like all windows with mullions, are merely actual s stone sashes, that can be removed and replaced like a wooden sash, without affecting the opening in which it is inserted. The different pieces composing these rose windows or mullitins are only held in place by the cut of the joints and by the rebate in which they are inserted. The jointing of these stone sashes is so arranged that each piece offers great stability while avoiding too great removal of stone (12). (Arts Meneaux, Roses). The joints always tend to the centres of the two internal curves,often without regard to the centres of the principal curves (13), so as to avoid spalling produced by too t thin parts. Further the tracery like rose windows serves as centering for the arches covering or enclosing them, and this stone sash cannot leave the vertical plane on account of tongue and groove arrauged in the arch (14). For example, sometimes in windows of side aisles of the nave of the cathedral of Amiens the groove intended to keep the tracery in a vertical plane is replaced by projecting crockets arranged on some of the voussoirs of the archivolt (15); these internal and e external crockets, between which passes the tracery, fulfil the purpose of stops of our wooden sashes.

One of the ground principles that directed the constructors of the 13 th and 14 th centuries in the arrangement of their jointing, was to leave to each part of the construction its function, its elasticity, its liberty of movement, so to speak. This war the means of avoiding ruptures in those colossal monuments. When the arches are destined to present a great resistance to pressure, they are composed of several rows of voussoirs with carefully cut extradoses and are of ordinary dimensions (about 1.0 to 1.2 ft.) without connections between them so as ts allow the construction to compress aud seat itself without causing rupture of the voussoirs; these are so many independent concentric circles able to move and even slip on

breaking stones; thus for example the angle returns are always headers and stretchers (3). The compound piers with columns are raised during the 11 th and 12 th centuries in courses w with bonded joints, where cavities are carefully avoided.(4). Later in the first half of the 13 th century, they are often formed of a cylinder built in courses, the columns surrounding it being detached and composed of one or several pieces s set on edge (5). The beds of the imposts of the arches are h horizontal to the point of separation from their common intersection, where each directs itself to its own side, then forming a series of voussoirs with extrados (6). Each architectural member is then taken in the height of the quarry bed, the bed being placed at the point most favorable for avoiding hollows and loss of stone; thus the astragal forms a part of the capital instead of belonging to the column as in Roman architecture (7). The base retains all its members cut in the same stone. The corona is separated from the cornice (8). The beds are placed at the junctions of the base mouldings with the s straight surfaces (9). In countries in which materials of different natures offer blocks varied in color, for example Auvergne, there have been employed yellow sandstone or white limestone and gray lava, so as to form mosaics on the surfaces of structures; churches of Notre Dame at Clermont (10), S. N Nectaire, Puy-en-Velay, Issoire, present arrangements in which stones of different colors form designs by their manner of a assemblage. During the 11 th and 12 th centuries much use was made of these arrangements produced by geometrical combinations; not only have these complex arrangements been employed to decorate plane surfaces, but also in the construction of arches, as may be seen in some edifices of Poitou, Mayenne a and the banks of the Loire. The west portal of church S. Etienne of Nevers gives us a beautiful example of these arches j jointed with especial care (11). In the 13 th century these arches are conscious of their oriental origin, but disappear to give place to a purely rational and methodical jointing, r resulting from the needs to be satisfied and the nature of t the materials; the principle is always of great simplicity, t the execution is pure, free and apparent. the materials have only the dimensions required for the place occupied. The body of the structure is a durable construction, the courses are

APPAREIL. Jointing. Stonecutting.

This name is given to the jointing of cut stones employed in the construction of an edifice. The jointing varies according to the nature of the material and its place; thus it has great importance in constructiou, often determines the form given to any part of the architecture, since it is only the judicious use of the material, according to its physical nature, resistance, texture, dimensions and the resources at command. Yet each style of architecture has adopted a jointing belonging to itself and always subject to common rules. Thus the examination of the jointing often serves for recognizing the age of a structure. Until the 12 th century the jointing preserved the traditions transmitted by the constructors of the late Roman empire. Then were only at command inferior modes of transportation, roads were scarcely passable, hoisting machines were insufficient, structures were built of small m materials, easily raised; walls and buttresses only presented stone faces, the interiors being filled with rubble (1); the materials were short and without tails, of heights given by quarry beds; and these were not always set on beds; sometimes high and low courses alternated, high ones on edge and low on bed. This jointing appears particularly in south France. In this case low courses extend more deeply than high ones i into the filliug, thus connecting the facing with the body of the masonry. Arches are employed for small spans because lintels required stones of large dimensions and consequently heavy (2). The facing is frequently made of rubble pointed, while window jambs, angles and buttresses are of dressed stones. These mixed constructions of rubble and cut stone are still o often found during the 12 th century in structures economically built, strong castles, private houses, churches in small places. The nature of the materials strongly influences the jointing adopted; thus in regions where cut stone is strong, quarried in large dimensions as in Burgundy and Lyonnais, the jointing is large and courses are high, while in provinces w where the materials are soft or cutting is easy, as in Normandy, Champagne and the West, the jointing is small and close, the stonecutters multiplying the joints to facilitate setting. One of the essential properties of the jointing adopted during the 12 th, 13 th and 14 th centuries is to avoid flushing and

omit those with backs attached to the internal piers of the S. Chapelle (12 th century), and that all bear a consecration c cross (2). These figures executed in lias with the most admirable work, covered by painted and gilded ornaments imitating rich fabrics enhanced by borders strewn with stones. This custom of placing the apostles against the piers of churches, -especially of choirs, was frequent, we will cite as one of the most remarkable examples the choir of the old cathedral of C Carcassonne from the beginning of the 14 th century. The apostles are also placed on the fronts of altars, on stone reredoses in wood or metal. On the piers of cloisters, as at S. T Trophime of Arles, around the capitals of the Romanesque period, on the rood screen, or engraved; on the borders of tombs during the 14 th, 15 th and 16 th centuries (3).

At the cathedral of Paris as at Chartres and Amiens, the 12 apostles are ranged in the splays of the principal doorway at both sides of Christ as man, who occupies the mullion at the middle; earlier in the reliefs of the 11 th and 12 th centuries as at Vezelay, they are seated in the tympanum at each s side of the triumphant Christ. At vezelay they are in the number of ten only, arranged in two groups; rays from the hands of Christ are directed to the haloed heads of the ten apostles; most of them hold open books (4).

On the royal portal of Chartres, the left tympanum represents the ascension, the apostles are seated on the lower lintel, all with heads turned toward our Lord elevated on clouds; four angels descend from heaven to the apostles and occupy t the second lintel. In all the sculptures or paintings of the 11 th to the 16 th century, the apostles have always bare feet, whatever the richness of their costumes; they are represented with heads covered only towards the end of the 15 th century. The example previously given is taken from the south portal of Amiens (13 th century), in which is noted one of these apostles, S. James, with head covered by a hat, that is perhaps unique. As for costume, it is invariably composed of the long robe or tunic, not separated for sleeves, girdle and round m mantle without clasps. It is only at the end of the 15 th century that the traditional costume is lost, and that the apostles are sometimes covered by vestments with forms recalling those of doctors of that epoch.

representing their persecutors, or recalling the principal e events of their lives. It is particularly during the 14 th a and 15 th centuries that the apostles are represented with a attributes, which aid in recognizing them, although this is not an absolute rule. At the south portal of the cathedral of Amiens, the lintel of the doorway is covered by half size statues of the 12 apostles. There they are represented as conversing together, some hold books, others unrolled scrolls ((1, 1 bis). This beautiful recief we give in two parts, although it is carved on one lintel and is only divided by the canopy crowning the Virgin, and is from the last half of the 13 th century. In the interior of the enclosure of the choir of the cathedral of Alby (beginning of the 16 th century), t the 12 apostles aee represented in painted stone; each holds in his hands a scroll on which is inscribed an article of the creed. William Durand in the 13 th century (Rationale div. off.) says that the apostles composed the creed before separating to go to convert the nations, and that each bears one of the 12 artilces by symbol (notes of M. Didron, Manuel d'Iconographie chretienne, p. 299 et seq.). In the religious edifices of the 11 th to 16 th centuries are often found legends separated by one of the apostles; these are met with in reliefs a and stained glass representing the story of the Virgin, as at the cathedral of Paris, on the beautiful left portal of the facade and in the street of the cloister. At Semur in Auxois, in the tympanum of the north portal (13 th century) is found the legend of S. Thomas sculptured with rare delicacy. That legend is frequently found in the stained glass of that epoch, like that of S. Peter. In France after the 12 th century, the types adopted to represent each of the 12 apostles are retained without change until the 15 th century. Thus S. Peter is alwans represented with curly head and hair, low forehead, b broad face, high shoulders, small height; S. Paul is bald, a lock of hair on the forehead, high skull, refined features, l long and silky beard, delicate body, hands delicate and long; S. John is beardless, young, curly hair, mild countenance; in the 15 th and especially in the 16 th centuries, S. Peter when alone is often costumed as a pope, tiara on the head and keys in the hand.

Among the most beautiful statues of apostles, we should not

with excessive delicacy. Among mural paintings, now very rare in France, we will mention those of the porch of church S. S Savin in Poitou, that gives some of the visions of Revelations. These paintings date from the beginning of the 12 th century.

APOTRES. Apostles.

In the canon of the mass, the twelve apostles are named in the following order:-- Peter, Paul, Andrew, James, John, Thomas, James, Philip, Bartholomew, Matthew, Simon and Thaddeus. Yet this order is not always accurately followed iu French Christian iconography from the 11 th to the 16 th century; Matthew, elected apostle in the place of Judas Iscariot (Acts, Chap. 1) frequently replaces Thaddeus; sometimes James the Less and Simon give place to the two evangelists Luke and Mark; Paul can find a place among the twelve apostles only by excluding one of those chosen by Christ himself, such as Jude, for example. It is then very difficult to designate the twelve a apostles by their names in the statuary of the 11 th, 12 th and 13 th centuries; later the apostles bear the instruments of their martyrdom or various distinguishing attributes, and can be named. Yet from the 13 th century in the statuary of our cathedrals, some apostles if not all are distinguished by the objects held in their hands. S. Peter generally carries two keys, S. Paul a sword, S. Andrew a diagonal cross, S. Jonn sometimes a chalice, S. Thomas a square, S. James an alms purse decorated by shells and a sword or book, S. Philip a Latiu cross, S. Bartholomew a cutlass, S. Matthew an open book. It is only at the end of the 11 th or the beginning of the 12 th centuries, that S. Peter is represented as holding the keys. We will cite the great tympanum of the church of Vezelay, that dates from that epoch, in which is seen S. Peter twice represented holding the great keys at the gate of Paradise, and near Christ. At the cathedral of Chartres, south portal, most of the apostles hold rules, at the cathedral of Amiens, west p portal, 13 th century, the instruments of their martyrdom or attributes drawn above. Sometimes Paul and the evangelists, Peter, James and Jude hold closed books; as at the cathedral of Rheims; at Amiens is seen a statue of S. peter holding a single key and a Latin cross in memory of his martyrdom. The apostles are frequently supported by little figures represent-

Velay (6). This tiger or liona you prefer, is in wood; its tongue is hung on an axis and is moved by a little counterpoise when the leaf of the door is opened; it was painted red and green. There exists on some capitals and corbels of Church S. Sernin of Toulouse a certain number of singular quadrupeds, who seem to hang on the architecture with a sort of frenzy; they are carved by the hand of a master (7). In the 14 th century the sculpture became poorer and leaner, almost limiting itself to the imitation of the northern flora, suppressing in great part the naimals in carwed or painted ornamentation; but during the 15 th century and the beginning of the 16 th, they are seen to reappear, then imitated mure scrupulously from nature, and filling by their dimensions only a very secondary place. They are apes, dogs, bears, rabbits, rats, foxes, snails, caterpillars, lizards and salamanders; sometimes however are also fanciful animals, distorted and exaggerated iu their mowements; such are those that were formerly s seen carved on the lintels of the mansion de la Tremouille at Paris. The representations of fables became more frequent and though sometimes indecent, they are found on capitals, friezes, woodwork, stalls and rood screens. Satire replaces tradition and popular beliefs. Artists abused the details by covering their edifices with neither motive nor reason, until the Renaissance came to sweep all these sports of wornout minds away, to substitute for them its own errors.

ANNELEE. Ringed. Bague.

APOCALYPSE. Revelation.

The book of the Revelation of S. John scarcely lends itself to sculpture; but on the other hand it opens a wide field to painting; thus these divine visions and obscure prophecies w were not entirely rendered in the middle ages, except in mural paintings or stained glass. The rose windows of great churches by their dimensions and their numerous compartments allowed glass painters to develop that vast subject. We will cite the southern rose window of the church of Mantes, whose stained glass dates from the beginning of the 13 th century, and r reprodaces with remarkable energy the visions of S. John. The rose window of the S. chapelle of the Palace, executed at the end of the 15 th century, presents the same subjects, rendered

thanks to innumerable sculptures and paintings, that cover o our ancient monuments, the fables again add their contingent to that series of animal representations. The lion, symbol of vigilance, power and courage, the antula, of cruelty; the caladre bird, of purity; the siren; the pelican, symbol of charity; the asp, who guards precious treasures and resists sleef; the screech owl, serpent and phoenix; the basilisk, personification of the devil; the dragon, to which were attributed such marvellous virtues (Melang. archaeol. of martin and Cahier), all these animals meet on the capitals of the 12 th and 13 th centuries, on friezes, attached to the angles of monuments, on the tops of buttresses and of balustrades. At Chartres, Rheims, Notre Dame of Paris, Amiens, Rouen, Vezelay, Auxerre, on the monuments of the west and the centre, are tribes of odd animals, always rendered with great energy. At the tops of the two towers of the facade of the cathedral of Laon, the sculptors of the 13 th century have placed in the open spires animals of colossal dimensions (3). At the angles of the buttresses of Notre Dame of Paris may also be seen sculptures of enormous beasts, which are detached against the sky and give life to these masses of stone (4). The balustrades of the cathedral of Rheims are surmounted by eccentric birds, draped and hooded. On the more ancient edifices of the 12 th century are friezes of interlaced animals devouring each other (5); capitals on which are strange beings, sometimes half man and half beast, possessing two bodies for one head, or two heads for one body; the churches of Poitou, Saintonge, Guyenne, the Romanesque monuments of Burgundy and the banks of the Loire, that while abandoning nature still have their own physiognomy, something real that strikes the imagination; it is a natural history aside, where all individuals could be classes by species. Each province possesses its special types, that one finds in edifices of the same epoch; but these types have a common character of savage power; they are all stamped by a very remarkable observation of nature. The members of these fanciful animals are always well attached, rendered with truth; t their contours are simple and recall the grace, that one cannot fail to admire in the feline race, in birds of prey, and in certain reptiles. We give here one of these animals, carved on one of the leaves of the portal of the cathedral of Puy-en-

about the 7 th century the personifications or signs of the e evangelists. During the 12 th century, sculpture being already very far advanced as an art, it is yet entirely symbolical; t the text of S. John is very accurately rendered. On the southern portal of the church of Moissac are seen represented on the tympanum of the portal Christ on a throne surrounded by four animals with halos and scrolls, but each having only two wings, and without the innumerable eyes; above the Christ and on the lintel are sculptured the twenty-four old men.On the royal portal of the cathedral of Chartres (1) is also seen t the Christ surrounded by the four animals alone. The twenty-four old men are arranged around the soffit of the portal. On the outer portal of the church of Vezelay are found on the t tympanum of the central doorway traces of Christ on his throne surrounded by the four animals and the twenty-four old men, placed in two groups on each side of the throne. Later and in the 13 th century the four animals only occupy very secondary places. For example, they are placed as on the principal portal of Notre Dame of Paris beneath the apostles, at the four projecting and reentrant angles of the two splays of the doorway. The order observed in the visions of S. John is lost, a and the four animals are no longer more than the personification of the four evangelists, accepted by all. They are found at the four angles of the towers, as on the tower S. Jacques-la-Boucherie of Paris, 16 th century, in the angles left by the mouldings enclosing the rose windows, in the tympanums of gables, on the buttresses of facades, on the bosses of vaults, and even on the capitals of the piers of choirs. Before the 13 th century, the four animals are usually alone; but later they often accompany the evangelists, which they cause to be recognized. Yet we will cite a singular example of statues of evangelists from the end of the 12 th century, which bear in their arms the symbolical animals. These four statues stand with backs against a pier of the cloister of S. Bernard de Comminges (2).

The decoration of religious and secular edifices presents an infinite variety of fanciful animals during the mediaeval period. The fables of the 12 th and 13 th centuries attribute to real or fabulous animals the symbolical qualities, which tradition has long preserved in the minds of the peoples, th-

The tops of wooden spires, covered with lead, or the ends of ridges of roofs of apses, were crowned by figures of angels in copper or lead, sounding trumpets, and by the arrangement of their wings serving as weathercocks. There existed at Chartres and at S. Chapelle of Paris angels so placed before the carpentry was burned. Angels sounding trumpets were sometimes set on the apexes of gables, as at Notre Dame of Paris; at the angles of bell towers, as at church S. Pere-sous-Vezelay. At the base of the stone spire of church of Semur-en-Auxois, four angels hold leather bottles according to the text of the Apocalypse (chap. 7): AA "I saw four angels at the four corners of the earth, who retained the four winds of the world." -- The central spire of the abbey church of Mont. S. Michel was formerly crowned by a colossal statue of the archangel M Michael overthrowing the demon, that he saw at ten leagues in the sea. In secular constructions were abused representations of angels during the 15 th and 16 th centuries. They have been made to support arms and devices; have been made supports and angle corbels. In the interior of the enclosure of the choir of the cathedral of Alby, which dates from the beginning of the 16 th century may be seen above the backs of the stalls a series of angels holding scrolls.

ANIMAUX. Animals.

S. John (Apocalypse. Chaps. 4, 5) sees in the opened heavens the throne of God surrounded by twenty four old men clad in white robes with crowns of gold on their heads; at the four angles of the throne are four animals, each having six wings and covered by eyes before and behind, the first animal is l like a lion, the second a calf, the third a man, and the fourth an eagle. This mysterious vision was often reproduced by sculpture and painting in the 12 th, 13 th, 14 th and 15 th centuries. Yet this was only with important modifications. D During the first centuries of Christianity the four animals were made personifications of the four evangelists; the lion for S. Mark, the calf for S. Luke, the augel (winged man) for S. Matthew, the eagle for S. John; yet S. John in writing his Apocalypse could not dream of this personification, because then the four Gospels were not written. However, the Apocalypse being regarded as a prophecy, these four animals became

they hold crowns between painted subjects representing martyrs. (4). At the central portal of the cathedral of Paris, although the series is not complete and neither cherubim nor seraphim are found, the first two soffits are occupied by angels at h half length extending from the hollou made in the moulding, appearing to be present at the great scene of the last judgment, and forming around the triumphant Christ a double halo of celestial spirits. This arrangement is unique, and these figures, whose poses are full of truth and grace, were executed with inimitable perfection, like all the sculpture of that admirable portal.

At the Museum of Toulouse is to be seeu a very beautiful a angel from the 12 th century in marble (4), taken from an annunciation, it is life size, holds a sceptre in the left hand, aud its nude feet rest on a dragon devouring a leafy tree; it has a halo; the sleeves of its tunic are ornamented by rich embroideries.

Over the triumphant Christ of the north portal of the cathedral of Bordeaux from the 13 th century may be noted two angels on foot, holding the sun and moon (6); this symbolical representation is found generally employed in crucifixions. (Art. Crucifiement). In the cathedral of Strasburg exists a pillar, called "pillar of the angels", on the top of which a are placed statues of angels sounding the trumpet, 13 th century (7). These angels have halos. On the finial terminating the perforated gables of the chapels of the 14 th century at the apse of the cathedral of Paris were formerly seen a series of angels playing on various musical instruments; this motive was often employed in churches of the 14 th and 15 th centuries. Angels frequently carry censers; in this care they are placed beside Christ, the Virgin, and even sometimes beside martyred saints. At S. Chapelle, the half tympanums of t the lower arcade are decorated by half length statues of angels coming out of a cloud and censing the martyrs painted in the quatrefoils of these arcades (8). Almost always they hold an incense box in the left hand.

Most of the high altars of cathedrals or principal churches in France, a century since were still enclosed by columns of copper, supporting angels also of metal, holding the instruments of the passion or torches. (Art. Autel).

(2); sometimes on private houses letters (3) or foliage (4).
There are also employed on some houses of the 15 th century wooden ones connecting the joists of the floors with the top and bottom sills of half timber work (5).

ANGE. Angel.

Representations of angels have been often employed in edifices of the middle ages, either religious or secular. Without mentioning here reliefs, stained glass and paintings, such as the last judgment, story of the Virgin, legends, where they n naturally find place, they play a great part in the external and internal decoration of churches. Angels are divided into nine choirs and three orders:-- the first order comprises thrones, cherubim, seraphim; the second, kingdoms, virtues, powers; the third principalities, archangels, angels.

The cathedral of Chartres presents a beautiful sculptured example of the angels on the southern portal, 13 th century. The north portal of the cathedral of Bordeaux also gives a c complete series of angels in its soffits. The chapel of Vincennes offers another of the 15 th century. As painting, there exists in the church of Saint-Chef a representation of the h hierarchy of angels, that dates from the 12 th century.(For more complete details see the learned Essay of M. Didron in the Manuel d'Iconographie chretienne,.p. 71). At the cathedral of Rheims is to be seen an admirable series of statues of angels placed in the great pinnacles of the buttresses (1). These angels are represented as draped, wings extended, feet nude, holding in their hands the sun and moon, the instruments of the passion of our Lord, or the different articles necessary for the sacrifice of the holy mass. At the central portal of the cathedral of Paris and over the last judgment, two angels of colossal dimensions are placed at the sides of the t triumphant Christ and hold the instruments of the passion. T The same arrangement is again found at the north portal of t the cathedral of Bordeaux (2), at Chartres and at Amiens. (Art. Jugement Dernier). At the cathedral of Nevers angels are placed in the interior in the tympanums of the triforium (3). At the S. Chapelle of Paris, angels occupy a similar place in the lower arcade; they are painted and gilded, detached from grounds incrusted with blue glass with designs in gold, and

carries an infant. That soul is then represented in the form of a young woman draped and crowned. This charming subject is impressed with a tenderness wholly divine, and must inspire the skilful artists of that time; it is always treated with love and executed with care. We give a relief from the 13 th century existing at Strasburg, in which the subject is skilfully rendered (2). One can see in the chapel of Liget a painting of the 12 th century, of the death of the Virgin; there the soul is a nude figure; Christ places it in the arms of t two angels, that descend from heaven.

Im stained glass and paintings, the possession of the souls of the dead is frequently disputed between angels and demons; in this case, the soul is sometimes represented as leaving t the mouth of the dying, and is always nude with joined hands, a young human figure without sex.

AMORTISSEMENT. Finial. Pinnacle.

A word applied to the crown of an edifice, to the architectural member terminating a facade, roof, gable or buttress; it is especially employed to designate the groups, the deformed gables decorated by vases, rockwork, consoles and volutes, so frequently employed during the 16 th century on the upper parts of facades, doorways, domes and dormers. In the period p preceding the Renaissance the word is equally applicable to certain crowns or terminations; thus the sculptured extremity of the slab covering of the church of Thor may be regarded as a finial (1); likewise certain cross-flowers placed at the a apexes of gables during the 13 th (2), 14 th and 15 th centuries. The tops of the buttresses of the apsidal chapels of t the cathedral of Amiens, 13 th century (3), are actual finials.

ANCRE. Anchor.

A piece of iron placed at the end of a rod to maintain the distance between walls. (Art. Chainage). Anchors are very rarely employed in construction before the 15 th century; cramps let into the stones and making them solid then took the place of rods. But in the secular structures of the 15 th century a are frequently visible anchors placed so as to retain the external surfaces of the walls. These anchors assume forms more or less rich, showing cross anchors (1), S. Andrew's crosses

thickness of a slab, on which rest the little columns or mullions dividing the window in secular edifices (1). During the 11 th, 12,th, and 13 th centuries, these panels below the windows are flush with the external face of the wall. In the 14 th century the mouldings or little columns serving a jamb and enclosing it descend to the belt set at the height of the floor, and the panel is recessed (2), thus indicating that it is only a filling and not forming a part of the construction. In the 15 th century, the panel is often decorated by blind balustrades, just as one still sees on a great number of houses at Rouen, the house of Jacques Coeur at Bourges (3); in the 16 th century arms, monograms, devices and emblems, as at the old mansion of Cour des comptes in Paris (4), built by L Louis XII, and on some houses at Orleans. The construction of that part of windows follows its transformations. In the early time the courses are continuous, and the panel combines with the external surface; later when the panels are accented externally, they are made of a single slab set on edge; sometimes the mullion descends to the belt of the floor, and the two parts of the pauel are only fillings, two slabs set ou edge, perfectly adapted to receive sculpture.

AMES. Souls.

The statuary of the middle ages often personifies souls. In reliefs representing the last judgment, in legendary reliefs, stained glass, tombs, souls are represented by human forms, young and often draped but sometimes nude. Among the figures decorating the soffits of the principal doorways of our churches, in the tympanum of which is placed the last judgment, on the right of our Lord is frequently noticed Abraham carrying a group of the elect in the skirt of his mantle (1); these are little nude figures with arms crossed on their breasts or with joined hands. In the curious relief filling the arch of the tomb of Dagobert at S. Denis (tomb erected by S. Louis), may be seen as represented under the form of a nude personage with brow encircled by a crown, the soul of Dagobert submitted to various tests before admission to heaven. In nearly all the reliefs of the death of the Virgin, sculptured during the 13 th and 14 th centuries, our Lord is present in the last moments of his mother, and he carries her soul in his arms as one

for passage. Not so. There exists in France a great number of cities founded at one cast during the 12 th, 13 th and 14 th centuries, that are perfectly aligned, like the cities in north America built by emigrants from Europe.

The feudal power had not at command the laws of appropriation for public utility; and when by successive additions of houses a city found itself badly aligned, or rather was not aligned at all, it was necessary indeed to take its own part; for if all suffered from the narrowness of streets and their irregularity, no person was disposed to benevolently demolish his house, any more than today, to yield an inch of land to widen the public way or to rectify an alignment. The supreme representative of the feudal power, the king, unless he proceeded to align a city by fire, like Nero at Rome, which was n not to the taste of the citizens, had no means of widening and straightening the streets of his good cities.

Philip Augustus was standing at a window of his Louvre on one of those beautiful spring mornings, when the sun attracts all the dampness, and it is said that his sense of smell was so offended by the stench exhaled by the streets of Paris, t that he resolved to pave them to facilitate the removal of t the water. From his time indeed commenced the paving of the public streets; he could pave the streets on his domain, but he could not even for money cause the facade of the meanest house of his capital to be set back without the consent of t the owner. Then our ancestors should not be blamed too much for disorderly instincts, but one should take into account t the customs and habits of their time before blaming them. It was not by preference that they lived in the midst of crooked and badly leveled streets, for when they built a new city, t they knew how to place the streets, to provide it with regular ramparts, to reserve in it squares with porticos, to erect t there fountains and aqueducts. We can also cite as examples t the cities of Aigues-Morts, the new city of Carcassonne, Villeneuve le Roy, Villeneuve l'Archeveque in Champagne, the city of Monpazier, whose plan we give (1); the city of Sainte Foy. All are cities built during the 13 th century.

ALLEGE. Panel below window.

This wall serving to support a window, having only the thick-

AIGUILLE. Pinnacle.

This name is frequently given to the pyramidal termination of a spire or turret, when very steep; also a term for the e end of a rafter of a framework piercing the roof and decorated by lead ornaments. (Arts. Fleche, Poincon).

ALBATRE. Alabaster.

A material frequently employed in the middle ages from the middle of the 13 th to the 16 th century for making statues of tombs, and frequently even for reliefs ornamenting these tombs, pierced ornaments opening to the black marble (1), and reredoses, towards the end of the 15 th century. The example here given is taken from the storehouse of S. Denis. There e exists in the cathedral of Narbonne a statue of the Virgin l larger than life, in oriental alabaster and of the 14 th century, which is a real masterpiece. The beautiful alabaster s statues of that epoch in France are not rare; unfortunately this material does not resist dampness. At the Louvre in the Museum of French monuments, in the church S. Denis, are found beautiful statues of alabaster taken from tombs. The mediaeval artists always polished alabaster when used for statuary, but in different degrees. Thus frequently the nude parts are left almost unpolished and draperies are polished, and sometimes the contrary occurs. Also frequently alabaster statuary is gilded or painted in parts, leaving the nude in the natural color. The Museum of Toulouse contains beautiful statues of alabaster removed from tombs; particularly one of an archbishop of Narbonne in gray alabaster, from the end of the 14 th c century, which is of great beauty; the slab on which the figure rests was incrusted with metal ornaments, probably of gilded copper, of which only the fastenings are found. (Arts. T Tombes, Statues).

ALIGNEMENT. Alignment.

Because most dediaeval cities were successively built on Roman cities or Gallic villages, in the midst of ruins or near huts, it has beeu lightly concluded, that the city officials of the middle ages had no idea of what is now termed the alignment of the streets of a city, that everyone could build as he liked by leaving before his house just the space necessary

because the ancient sanctuaries having been preserved during the rebuilding,of the naves, it was necessary afterwards to rebuild the apses to place them in harmony with the new arrangements.

ACCOLADE. Brace moulding.

This name is given to certain curves crowning the lintels of doors and windows, especially in civil architecture. Only towards the end of the 14 th century did men begin to employ these forms produced by circular arcs, and that appear only i intended to decorate the external faces of lintels. At their origin these mouldings are scarcely apparent (1); later they are detached and become more apparent (2); then at the beginniug of the 16 th century assume much importance (3), and almost always accompany the heads of doorways, arches, decorate the caps of stone dormer windows, are found in the small details of galleries, balustrades, pinnacles and turrets.

This curve is applied both to lintels of stone or wood in domestic architecture.

ACCOUDOIR. Arm of Choir Stall.

This name is given to the partition between the stalls, which allows seated persons to lean on it when the seats are r raised. (Art. Stalles). The arms of stalls are always enlarged at their ends in spatula form to allow persons seated in adjacent stalls to lean thereon without incommoding each other.(1). The arms are often supported, either by animals, heads, figures or little columns (2). Beautiful arms may yet be seen in the stalls of the cathedral of Poitiers, churches of Notre D Dame de la Roche, Saulieu, 13 th century; churches of Bamberg, Anellau, Abbey Chaise-Dieu, church S. Gereon of Cologne, 14 th century; of Flavigny, Gassicourt, Simarre, 15 th century; Cathedrals of Alby, Auch, Amiens, churches of S. Bertrand of Comminges, Montreal, S. Denis in France, brought from Chateau Gaillon, 16 th century.

AGRAFE. Cramp, clamp, Anchor.

Piece of iron or bronze for connecting together two stones. (Art. Crampon).

This mode of ending the choirs of churches is particularly suitable for edifices constructed with economy and small dimensions. Thus it has been frequently employed in villages or small places, particularly in the north and in Burgundy. We cite the rectangular apses of the churches of Montreal, 12 th century; Vernouillet (11), 13 th century; Gassicourt near Mantes, 14 th century; Tau (12) near Bayeux, end of 14 th century; Clamecy, 13 th century, surrounded by the side aisle.

We also mention churches with twin apses, having several e examples, and among the most remarkable are the church of Varen, 12 th century, of Thor at Toulouse, end of 14 th century (13). In the churches of ancient foundation, the crypts are always found placed beneath the apses; so the floors of apses, as much by reason of this arrangement as by tradition, are f found elevated by several steps above the floor of the nave. The churches of S. Denis in France and of S. Benoit sur Loire present complete examples of crypts built under apses, and so constructed as to raise the pavement of the central apse from 15 to 20 steps above the level of the transept. (Art. Crypte).

Among the most remarkable and most complete apses may be c cited those of the churches of Ainay at Lyons, Abbaye des Dames at Caen, Notre Dame du Port at Clermont, S. Sernin at Toulouse, 11 th and 12 th centuries; of Brioude, of Fontgombaud, the cathedrals of Paris, Rheims, Bourges, Auxerre, Chartres, Beauvais and Seez; churches of Pontigny, Vezelay, Semur in A Auxois, 12 th and 13 th centuries; cathedrals of Limoges, Narbonne, Alby; churches of S. Ouen of Rouen, 14 th century; cathedral of Toulouse, church of Mont s. Michel, 15 th century; church of S. Pierre of Caen, S. Eustache of Paris, of Brou, 16 th century. Generally the apses are the most ancient parts of religious edifices:-- 1, because the construction of the churches commenced there; 2, because being the sacred place, where the worship was performed, men always hesitated to modify the traditional arrangements; 3, because by the nature itself of the construction, this part of the religious monuments of the middle ages is the most solid, that better resisting the thrusts of the vaults, fires, and in our climate having the best exposure.

Yet there are exceptions to this rule, but they are quite rare, and have been produced by particular accidents, or bec-

Mantes and of Poissy, or doubled as formerly existed at the cathedral of Paris before the addition of the chapels of the 14 th century (5). Apsidal chapels are seen to appear in the great edifices belonging to the style of Isle de France at C Chartres and Bourges (6); these chapels are then small and s separated; they are scarcely more than niches lower than the side aisles.

Yet this is not at all a general rule; the apse of the church of S. Denis possesses chapels dating from the 12 th century, already taking a great importance; it is the same in the choir of the church of S. Martin des Champs at Paris (7). This plan presents a peculiarity in the wider bay on the axis of the c choir and the great central chapel. Here as at S. Denis, as in the churches of S. Remy of Rheims and that of Vezelay (8), structures erected during the 12 th century or the first years of the 13 th, is noted an arrangement of chapels appearing to belong to abbey churches. Thise chapels open widely to the s side aisle, have small depth, and communicate together by a sort of double nave side aisle, which produces a great effect in execution.

During the course of the 13 th century, chapels took their full development. The chevets of the cathedrals of Rheims, A Amiens (9), Beauvais, erected 1230 - 1270, have left us remarkable examples.

Then the apsidal chapel placed on the axis of the church a and dedicated to the Madonna, begins to assume an importance, that increased during the 14 th century, as at S. Ouen of Rouen (10), to soon form a little church annexed to the chevet of the large one as at the cathedral of Rouen, and later in nearly all the churches of the 15 th century.

The construction of apses and apsidal chapels, that retained circular forms in edefices erected before the 13 th century, abandoned this system with the Romanesque tradition, to employ the polygonal plan more easily combined with the system of v vaults with ribs, then adopted, and with the opening of great mullioned windows, which could not be built on a circular plan.

In France, rectangular apses are only found in edifices of moderate importance. We have already cited the cathedral of Laon and the church of Dol, which are terminated by rectangular apses and great windows, like most English churches.

word apse rigorously should only be applied to the platform or half dome terminating the antique basilica, it is now employed to designate the chevet, the extremity of the choir, and even the circular or polygonal chapels of the transepts or of the semicircular choir. For example, apsidal chapels, i.e., chapels around the principal apse; rectangular apse; the cathedral of Laon, church of Dol(Brittany), are termeinated by r rectangular apses, as well as many small churches of Isle de France, Champagne, Burgundy, Brittany and Normandy. Certain churches have their transverse aisles terminated by semicircular apses, such as the transepts of the cathedrals of Noyon, Soissons, Tournay in Belgium; churches of S. Macaire near Bordeaux; S. Cartin of Cologne, all being churches built during the 12 or at the beginning of the 13 th centuries. In the south of France, the arrangement of the apse of the antique basilica was retained longer than in the north; the apses are g generally deprived of side aisles and of radiating chapels u until about the middle of the 13 th century; their vaults in half domes are lower than those of the transept; such are the apses of the cathedrals of Avignon, the churches of Thor (1), of Chauvigny, in Poitou (2), of Autun, of Cosne-sur-Loire (3), churches of Angoumois and of Saintonge, and later those of t the cathedrals of Lyons, Beziers, Carcassonne and Viviers. B But it is necessary to note, that the apses of the churches of Provence are generally muilt on a polygonal plan, while th those of the provinces farther north are erected on a circular plan. In the central provinces, Roman influence dominates, while in Provence and ascending the Rhone and the Saone, the Greco-Byzantine influence makes itself felt until the 13 th century.

Yet from the end of the 11 th century may be seen side aisles and radiating chapels around the apses of certain churches of Auvergne, Poitou and of the centre of France; this fashion extends during the 12 th century as far as Toulouse. Such are the apses of S. Hilaire of Poitiers (4), of Notre Dame du Port at Clermont, S. Etienne of Nevers, S. Sernin of Toulouse. In Isle de France and Normandy with some exceptions, the apses of churches rarely have radiating chapels until about the beginning of the 12 th century, and frequently the choirs are only surrounded by single side aisles, like the churches of

different layer of stone; it relly fulfils the function of a block serving as a support of the impost of the arches. From the middle of the 13 th century to the Renaissance, in losing its importance as a moulding, the abacus is generally cut in the samy layer with the capital; sometimes even the foliage decorating the capital dies against the lower member of its mouldings. In the 15 th century the ornaments cover the mouldings of the abacus, which is concealed under this excess of vegetation. The ratio between the height of the mouldings of the abacus and the capital, between the projection and course of its mouldings and the arrangement of its foliage and ornaments, is very important to observe; for these proportions a and the character of these mouldings are modified, not only according to the progress of mediaeval architecture, but also according to the place occupied by the capitals. Principally in the 13 th century, the abacus is more or less thick, and its profile more or less complex, according to whether the c capital is placed more or less near the ground. In the elevated parts of edifices, the abacus is very thick, broadly profiled, while in the lower parts it is thinner and delicately moulded.

ABAT-SONS. Louvres, or louvre boards.

This name is given to the wooden planks covered by lead or slates, attached to the woodwork of belfries to protect them from rain and to reflect the sound of the bells toward the ground. It was only during the 13 th century, that men commenced to furnish belfries with louvres. Until then the openings of belfries were small and narrow, remaining exposed to the open air. Vestiges of louvres preceding the 15 th century are only found in manuscripts (1). They were often ornamented by perforations, by sawteeth at their lower edges (2), or crimps in the lead.

ABAT VOIX. Sounding board. (see Art. Chaire).

ABBAYE. Abbey. (See Art. Architecture Monastique).

ABSIDE. Apse or Apsis.

This is the part terminating the choir of a church, either by a semicircle, a half polygon or a flat wall. Although the

centuries before they left their natural path; this is not b because we wish to see built among us today houses and palaces of the 13 th century, but because we regard this study as able to restore to architects that flexibility, that habit of applying a true principle to everything, that native originality and independence, which pertains to the genius of our country. If we only produce among our readers the desire to examine thoroughly an art too long forgotten, if we contribute only to make loved and respected works, that are the living expression of our progress for several centuries, we shall believe our task fulfilled; and however weak the results of our efforts, at least we hope that they will make known, that between antiqmity and our time, there was done an immense work by which we can profit, if we know how to gather and select the results.

Viollet-le-Duc.

not see by discussions occurring under Louis XIV, when it was a question of completing the Louvre, that the king, the superintendent of buildings, Colbert, and all the court gave their opinions, busied themselves with orders, cornices and all that concerns the art, ending by confiding the work to a man, who was not an architect, who only knew how to construct an expensive facing, whose least defect to us, that it had no connection whatever with the monument, and made useless a fourth of its area. Civilization is gauged by its arts, for the arts a are the energetic expression of an epoch, and there is no art without the independence of the artist. The study of the arts of the middle ages is an inexhaustible mine, full of original and bold ideas, keeping the imagination aroused, and this study obliges us to search without ceasing, and consequently it powerfully develops the intelligence of the artist. Architecture from the 12 th century until the Renaissance never allowed itself to be conquered by difficulties, it frankly attacked them; never being at the end of its resources, it only sought them in a true principle. It even too frequently abused this habit of surmounting difficulties, among which it loved to m move. This a defect? Can we reproach it with this? It belongs to the nature of the spirit of our country, to its progress and its acquisitions, by which we profit, in the midst of which this spirit is developed. It denotes the intellectual efforts from which modern civilization has escaped, and modern civilization is far from being simple; if we compare it with pagan civilization, how many new movements shall we not find overcharged; why then desire to return in the arts to simple forms, when our civilization, whose arts are merely its imprint, is so complex? However admirable is Greek art, its deficiencies are too numerous for it to be applied in practice to our customs. Its directing principle is too foreign to modern civilization to inspire and sustain our modern artists. Why not then accustom our minds to those fertile labors of the centuries from which we came? We have too frequently seen that what is wanting to modern conceptions in architecture is flexibility, that freedom of an art living in a society known to it; our architecture restricts or is restricted outside its age, or is complaisant towards meanness, even to despise good sense. If then we recommend the study of the arts of past cen-

intelligent and laboring peopleits freedom of procedure. The arts belonged to the people, and no one among the upper classes dreamed of directing them, of causing them to deviate from their course. When the arts were no longer exclusively practised by the regular clergy, and they left the monuments to be distributed among a hundred lay guilds, it does not appear t that a single bishop opposed this natural movement; to assume further that the chiefs of the Church, who had aided so powerfully and with such laborious perseverance Christian civilization, would have arrested a movement, that indicated better than any other symptom that civilization was distributed in the middle and lower classes. But the arts in passing outside the monasteries carried with them ideas of emancipation, of intellectual liberty, that must strongly attract people desirous to learn, live, act and express their tastes and tendencies. It was henceforth on stone and wood, in paintings and stained glass, that the people were to express their desires and hopes; there without constraint they could silently protest against the use of force. After the 12 th century this p protest did not cease to appear in all art works decorating our mediaeval edifices; it began seriously, basing itself on the sacred texts, became satirical at the end of the 13 th century, and ended with caricature in the 15 th century. Whatever its form, it is always frank, free, even sometimes crude. With what pleasure did the artists express themselves in their works concerning the triumph of the weak and the fall of the powerful! What artist of the time of Louis XIV would have dared to place a king in hell beside a miser or a murderer? What painter ir sculptor of the 13 th century would have placed a king in the clouds surrounded by a halo, glorified as a god, holding the thunderbolts, and having at his feet the powerful men of the century? Is it possible to admit, when one studies our great catthdrals, our castles and dwellings of the middle ages, that any will other than that of the artist has influenced the form of their architecture, or the system adopted in the decoration and construction? The unity prevailing in these conceptions, the perfect harmony of details with the whole, the accord of all parts, do not these demonstrate that a single will presided over the erection of these works of art? Could this will be other than that of the artist? And do we

harmony in the use of forms, instinct for proportions, all t the qualities composing an art, whether applied to the most humble peasant's cottage, the richest castle or the palace of the sovereign. In fact a civilization cannot pretend to possess an art only if that art penetrates everywhere, if it makes its presence felt among the most common works. Now of all the western countries of Europe, France is still that in which t this happy faculty is best preserved, for it has possessed it in the highest degree since the Roman decadence. In all times France has imposed its arts and fashions upon a great part of the European continent; it has vainly attempted since the Renaissance Italian, German, Spanish or Greek, its instinct or the native taste contained in all classes in the country has always brought it back to its own genius, elevating it again after the most serious errors; we believe it well to recognize this, for artists have too long scorned this feeling, and have not known how to profit by it. Particularly since the reign of Louis XIV, artists have pretended to form an isolated body in the country, a sort of foreign aristocracy despising the instincts of the masses. In separating themselves from the crowd, they have no longer been understood, have lost all their influence, and it did not depend upon them, that barbarism should not regain without recourse all remaining outside their sphere. The proof of this is the inferiority of the execution of the works of the two last centuries in comparison to the preceding centuries. Architecture in particular, that can only produce by the aid of a great number of workmen of all trades, presents at the end of the 18 th century only a degenerate e execution, soft and poor, deprived of style to the point of regretting the productions of the Roman late empire. The royalty of Louis XIV by setting aside all else in France, in desiring to be the principle of everything, uselessly absorbed the living forces of the country, perhaps even more in art th than in politics; and the artist needs to produce in order to preserve his independence. Feudal power certainly was not a protector of material liberty; the kings and secular lords as well as the bishops and abbots did not understand, and could not comprehend what we term political rights; they have been misused in our time, and what was done in the 12 th century! But these separate powers, often even rivals, left to the in-

justly shocked by the sight of reproductions of an art, whose reason is not understood, that appears at most a play to amuse some minds interested in old things, but in a practice one s should beware of engaging in. Indeed if any art must always be the slave of reason and good sense, that is architecture. Its fundamental laws are the same in all countries and times, the first condition of taste in architecture being that of b being subject to its laws; and the artists, after having blamed the contemporary imitations of Roman temples in which can neither be found the inspiration causing their erection, nor any connection with our habits or needs, who have constructed imitations of Romanesque or Gothic forms, without considering the motives causing the adoption of these forms, have only p perpetrated again in a coarser manner the errors that they o opposed.

Two things should first be taken into account in the study of an art, the knowledge of the creative principle, and choice in the work created. Now the principle of French architecture at the time, when it developed with great energy from the 12 th to the 13 th centuries, was the constant subjection of the form to the customs and ideas of the moment, harmony between clothing and body, incessant progress, the opposite of immobility; the application of this principle could only cause art to retrograde, but even make it stationary. If all the monuments produced by the middle ages were irreproachable, they s should not be servilely copied if a new edifice be erected, f for this is only a language to be learned for use in expressing a thought, but not to repeat what others have said; in t the restorations, even when the only concern is to reproduce or repair destroyed parts, it is very important to take into account the causes producing the adoption or modification of some primitive arrangement, in applying a certain form, the general rules leave the architect without resources before n numerous exceptions presented at each step, if he is not permeated by the spirit, that directed the old builders.

In this work will often be found examples, that mark the i ignorance, uncertainty, attempts and exaggerations of certain artists; but one will do well to note, that he will find the influence and even sometimes a true principle, a method, at the same time being great individual freedom, unity of style,

his formulas and principles obeyed in his time, and if he could pecome permeated by our modern ideas, if there were placed at his command all the improvements made in the industries, he would not build an edifice of the time of Philip Augustas or of S. Louis, because he would thus falsify the first law of his art, which is to adapt himself to the needs and customs of his time, to be rational. Perhaps resources never more numerous have been offered to architects; artizans are many, i intelligent and skilful; industry has attained a high degree of perfection never before reached. What is lacking in all t that is a soul, that vivifying principle that makes every art work respected, that causes the artist to oppose reason to the frequently ridiculous caprices of persons or of incompetent officials too much disposed to regard art as superfluous, a matter of caprice or of fashion. For the artist to respect h his work, it must have been conceived in the intimate conviction, that this work emanates from a true principle, based on the rules of good sense, taste frequently is nothing else, a and for the artist to respect himself, his convictions cannot be in doubt; how man it be assumed, that an artist will be r respected, who is subject to all the peculiarities of a capricious amateur, and builds for him according to the caprice of the moment, a Chinese, Arab, Gothic or Renaissance house? What becomes of the artist in all that? Is he not a tailor, that clothes according to our fancy, nothing in himself, neither has nor can have a preference, personal taste, nor the initiative that particularly constitutes the creative artist. But the study of an architecture whose form is subject to a principle, as the body is to the soul, can be neither incomplete nor superfecial. We do not fear to say, that what has retarded more the development of the revival of our national architecture, a revival by which one should profit in future, is badly directed zeal, the imperfect knowledge of an art in which many only see an original and attractive form without appreciating its reason. Thus we have seen arise pale copies of a body with absent soul. Archaeologists describing and classifying forms are not always practical architects, only being able to speak of what strikes their eyes, but the knowledge of the why must necessarily be lacking to these purely material classiffcations, and the good sense of the public is just-

to convince one's self (if this needed strengthening by proofs), by seeing with what avidity the public in France, England and Germany takes up all works treating of history or archaeology, with what eagerness errors are removed, monuments and texts are brought to light. It seems that new discoveries aid this general movement. At the moment when the artist's hand does not suffice to gather the numerous and precious remains of our ancient edifices, appears photography, which forms in a few years a faithful collection of all these remains. Wise administrative arrangements collect and centralize the scattered documents of our history; departments and cities see societies founded within them for the preservation of the monuments spared by revolution and speculation; the state budget in the midst of the gravest political crises, does not fail to contain important sums to save from ruin so many works of art, 1 long forgotten. And this movement does not follow the variations of a fashion, but is constant, more marked each day, and after originating in the midst of some enlightened men, it g ---------gradually spreads in the masses; it must even be termed especially pronounced in the industrial and citizen classes, among men in which instinct acts rather than education; they seem to recognize themselves in these works sprung from the national genius.

When it concerns the reproduction and continuance of the w works of the past centuries, it is not from below that difficulties arise, and artizans are never wanting. But it is precisely because this tendency differs from a fashion or a reaction, that it is very important to introduce a careful choice, an impartial and severe criticism into the study and use of materials, that may contribute to restore to our country an art adapted to its genius. If this study be incomplete and n narrow, it will be sterile and will do more harm than good; it will increase the confusion and anarchy into which the arts have fallen during some fifty years, and that leads us to decadence; it will bring another element of disorder; on the c contrary, if this study be directed by intelligence and care; if the official instruction frankly adopts it and ceases its errors, reunites in its hands so many partial efforts, lost for lack of a centre, the arts will not delaw, and the art of architecture will resume tha rank, that belongs to it in an

at old age by a series of insensible transformations, and without it being possible to tell the day at which infancy ceases and old age commences. These reasons, and perhaps our lack of powers, have decided us to give this work the form of a d dictionary. This form facilitates the researches of the reader, and permits us to present a considerable mass of information and of examples, which could not find their place in a history, without rendering the statement confused and perhaps unintelligible. It has seemed to us, just on account of the multiplicity of examples given, to be more favorable to studies, to make better known the various complex parts, though rigorously derived from their needs, which enter into the composition of our mediaeval monuments, since we are then obliged to direct them separately while describing the functions, the purposes of the different parts, and the modifications to which they have been subjected. We know that this complexity of the mediaeval arts, the diversity of their origin, and that incessant search for something better, that quickly ends in abuse, have repelled many minds, have caused the repulsion felt by them, and still experienced for a study, whose aim does not clearly appear. It is shorter to deny than to study; for a long time men would not see in this development of an intellectual portion of our country only chaos, absence of all order and reason, and yet if one penetrates the midst of that chaos, if one desires the sources of mediaeval architecture to spring forth one by one, and one takes the trouble to follow their course, the natural slope is soon discovered toward which all tend, and how fruitful they are. One must recognize, that the time of blind negation is already far distant, our century seeking to review the past; it appears to recognize (and in that we believe it right), that to break a path into the future, one must know whence he comes, and profit by all that preceding centuries have laboriously gathered. This feeling is something deeper than a reaction against the destructive spirit of the last century, and is a necessity of the time; if some excesses have frightened serious minds, if the love of the past has sometimes been pushed to fanaticism, there no less remains at the bottom of the intellectual life of our era a general and very marked tendency toward historical studies, whether pertaining to politics, legislation, letters or arts. It suffices

find the connection of the influences, to analyze their combinations and define their results; to take into account local traditions, tastes and customs of the peoples, laws imposed by the use of materials, commercial relations, the particular genius of the men that exerted an influence on events by hastening or varying their natural course, to not lose sight of the incessant investigations of a forming civilization, and to become saturated by the encyclopedic, religious and philosophical spirit of the middle ages. It is not today, that western Christian nations have inscribed the work "progress" on their standards; and progress means labor, struggle and change.

Antique civilization is simple and single; it absorbs instead of giving forth; quite different is Christian civilization; it receives and gives, it is movement, divergence without possible interruption. These two civilizations have necessarily proceeded very differently in the expression of their arts; one may regret this, but not oppose it; one may write a history of art, Egyptian, Greek or Roman, because these arts follow a path whose uniform slope ascends to the climax and descends to the decadence without deviating, but the life of man does not suffice to describe such rapid changes as of the arts of the middle ages, to seek the causes of these changes, to count singly all the links of this strongly welded chain, although composed of such different elements.

When archaeological studies of the middle ages were made o only to set the first stakes, to attempt an entirely conventional classification, to divide the arts into periods, into primary, secondary, tertiary and transitional styles, and to assume that modern civilization had proceeded like our globe, whose crust changes its nature after each great convulsion; but in fact that classification, however satisfactory it may appear, did not exist, and from the Roman decadence to the Renaissance of the 16 th century is a series of transitions without steps. We do not wish here to blame a method that has rendered vast services, by placing salient points, that it f first put order in studies, and which has permitted the clearing of the ground; but we repeat, that this classification d does not exist, and we believe the moment has arrived for studying the art of the middle ages, as one studies the development and life of an animated being, which from infancy arrives

the East; shall we not profit by this labor of several centuries? Shall we destroy and refuse to preserve those ancient possessions, envied with reason by all Europe? Shall we be the last to study our own language? Monuments of stone or of wood perish, it would be follow to desire to preserve all, and to attempt to prolong their existence in spite of material conditions, but what cannot and should not perish, is the spirit that erected those monuments, for that spirit is our own, it is the soul of our country. In the work that we today deliver to the public, we have attempted, not only to give numerous examples of the different forms adopted by the architecture of the middle ages, according to a chronological order, but especially and chiefly to make known the reasonsfof those forms, the principles causing their adoption, the customs and ideas within which they originated. It has seemed to us difficult to give an account of the successive transformations of the architectural arts without at the same time giving a review of the civilization, whose architecture is its enclosure, and if the task be found beyond our powers, we have at least opened a new path to follow, for we cannot admit the study of the clothing independently of the man that wears it. Now all sympathy for any form of art being set aside, we have been s impressed by the complete harmony existing between the arts of the middle ages and the spirit of the people within which they were developed. From the moment in which the civilization of the middle ages felt itself alive, it tends to progress r rapidly, and proceeds by a series of attempts without pausing an instant; scarcely has it seen a principle than it has deduced its results, and it promptly abuses it without taking t-time to develop its idea; that is the weak side, but also the instructive side of the arts from the 12 th to the 16 th centuries. The arts comprised in this period of three centuries, cannot be seized at one point, but they are an unbroken chain, all its links being welded in haste and by the imperious laws od logic. To desire to write a history of mediaeval architecture would be to attempt the impossible, for it would be necessary to comprise at once, and to carry on parallel the religious, political, feudal and civil history of several peoples; it is necessary to state the various influences that brought tteir elements to different stages in various countries, to

that it would attempt some work of destruction. But it must be said to our shame, the artists remained behind, the architects hastened to Italy, never commencing to open their eyes until at Genoa or Florence; they returned with their portfolios filled with studies made without criticism or order, and then commenced work without setting a foot within a monument of their own country.

The Commission of Historical Monuments instituted by the Minister of the Interior however began to gather a small number of artists charged with studying and repairing some of the m most beautiful monuments of the middle ages. To that impulse prudently given from the origin, do we owe the preservation of the best examples of our national architecture, a happy r revolution in the studies of architecture, and having been a ablé to study for long years the edifices covering our provinces, and to collect the elements of this work, which we present today to the public. In the midst of difficulties renewed without ceasing, with small resources, the Commission of Historical Monuments has obtained immense results; however weak may be this praise from us, it would be ingratitude to not g give it,for while preserving our edifices, it has modified t the course of architectural studies in France; while occupying itself with the past, it has founded for the future.

What constitutes a nation is the bond, that intimately connects the different periods of its existence; one must complain of peoples who deny their past, for they have no future before them! The civilizations that have plowed a deep furrow in history, are those in which traditions have been best respected, and whose maturity has preserved all the characteristics of their infancy. Roman civilization presents a very striking example of what we present here; and what people has had more respect for its cradle than the Roman! Politically speaking, no country is based on a principle of unity more c compact than in France, in spite of very marked differences of origin; it was then neither just nor sensible to wish to destroy one of the causes of that unity; its arts from the R Roman decadence until the Renaissance.

Indeed the arts in France from the 9 th to the 15 th century pursued a regular and logical course, they radiated into England, Germany, the north of Spain, even into Italy, Sicily and

PREFACE.

When we commenced the study of the architecture of the middle ages(twenty-five years since; 1829), there existed no books to show us the path to follow. We remember that a great number of the masters of architecture scarcely admitted the existence of these monuments, which cover the soil of Europe and everywhere in France. Scarcely was permitted the study of some edifices of the French and Italian Renaissance; as for those erected from the late empire until the 15 th century, they were scarcely mentioned except to cite them as products of ignorance and of barbarism. If we felt seized by a sort of mysterious admiration of churches and our French fortresses of the middle ages, we dared not confess a liking, that seemed a kind of depraved taste, a scarcely admissible inclination. And yet by instinct we were attracted to those great monuments, whose treasures seemed to us reserved for those, who were willing to devote themselves to seeking them.

After a stay of two years in Italy, we were more vividly impressed again by the sight of our French edifices, but by the sagacity and science that governed their erection, by the unity, harmony and method pursued in their construction as in t their decoration. But already distinguished minds had opened the way; enlightened by the labors and the admiration of our English neighbors, they thought of classifying the edifices by styles and periods. They no longer adhered to texts, erroneous for the most part, but accepted an arcaeological classification based on the monuments themselves. The first labors of M. de Caumont emphasized the very distinct characteristics of the different epochs of northern French architecture. In 1831, M. Vitet addressed to the Minister of the Interior a report on the monuments of the departments of Oise, Aisne, Nord, Marne and Pas-de-Calais, in which the elegant writer described for the attention of the government the treasures, unknown, although at our gates. Later M. Merimec pursued the researches so happily commenced by M. Vitet, and passing through all the ancient provinces of France, saved from ruin a number of edifices, that none then thought of regarding, and which today form the wealth and pride of the cities possessing them. M. Didron explained the sculptured and painted poems that cover our cathedrals, and ruthlessly pursued vandalism everywhere,

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By

EUGENE EMANUEL VIOLLET-LE-DUC

Government Architect

Inspector General of Diocesan Edifices

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From Abaque to Aronde

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